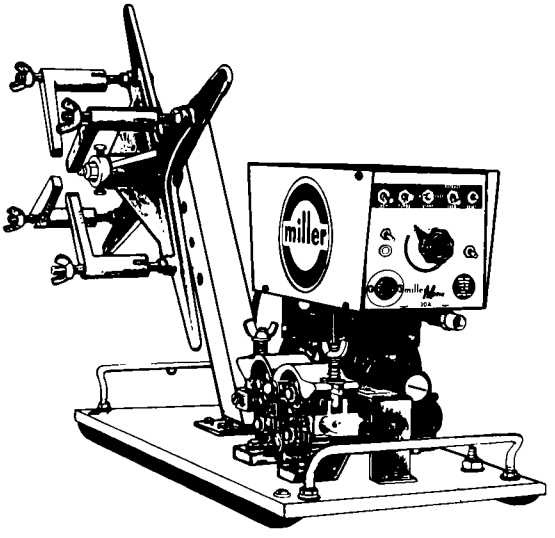
August 1973 FORM: OM-1234



MODEL	STOCK NO.
MILLERMATIC 30AN CONTROL/FEEDER	
.030 Wire V-Groove	058 484
.035 Wire V-Groove	058 485
.045 Wire V-Groove	058 486
1/16 Wire V-Groove	058 488
.045 Wire U-Groove	058 489
.052 Wire V-Groove	058 487
1/16 Wire U-Groove	058 490
5/64 Wire U-Groove	058 491
3/32 Wire U-Groove	058 492
7/64 Wire U-Groove	058 493
1/8 Wire U-Groove	058 494
1/16 Wire V-Knurled	058 495
5/64 Wire V-Knurled	058 496
3/32 Wire V-Knurled	058 497
7/64 Wire V-Knurled	058 498
1/8 Wire V-Knurled	058 499

MODEL/STOCK NO.	SERIAL/STYLE NO.	DATE PURCHASED

OWNER'S MANUAL

MILLER ELECTRIC MFG. CO.
APPLETON, WISCONSIN, USA 54911

ADDITIONAL COPY
PRICE 75 CENTS

NWSA CODE NO. 4579

PRINTED IN U.S.A.

ERRATA SHEET

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

SPINDLE ASSEMBLY INSTALLATION ON UNITS EFFECTIVE WITH SERIAL NO. HE741584

1. Insert spindle support shaft (item 12, Figure 2) into the desired hole in spindle support (13). The hole to be utilized in the spindle support (13) will depend on the size of the wire spool being used.

2. Slide washer (14) onto spindle support shaft (12) and secure with nut (15) and cotter pin (16).

3. Slide the following items onto the spindle support shaft (12) in order given:

   A. Flat washer (11)

   B. Flat washer (10)

   C. Spindle (9)

   D. Flat washer (8)

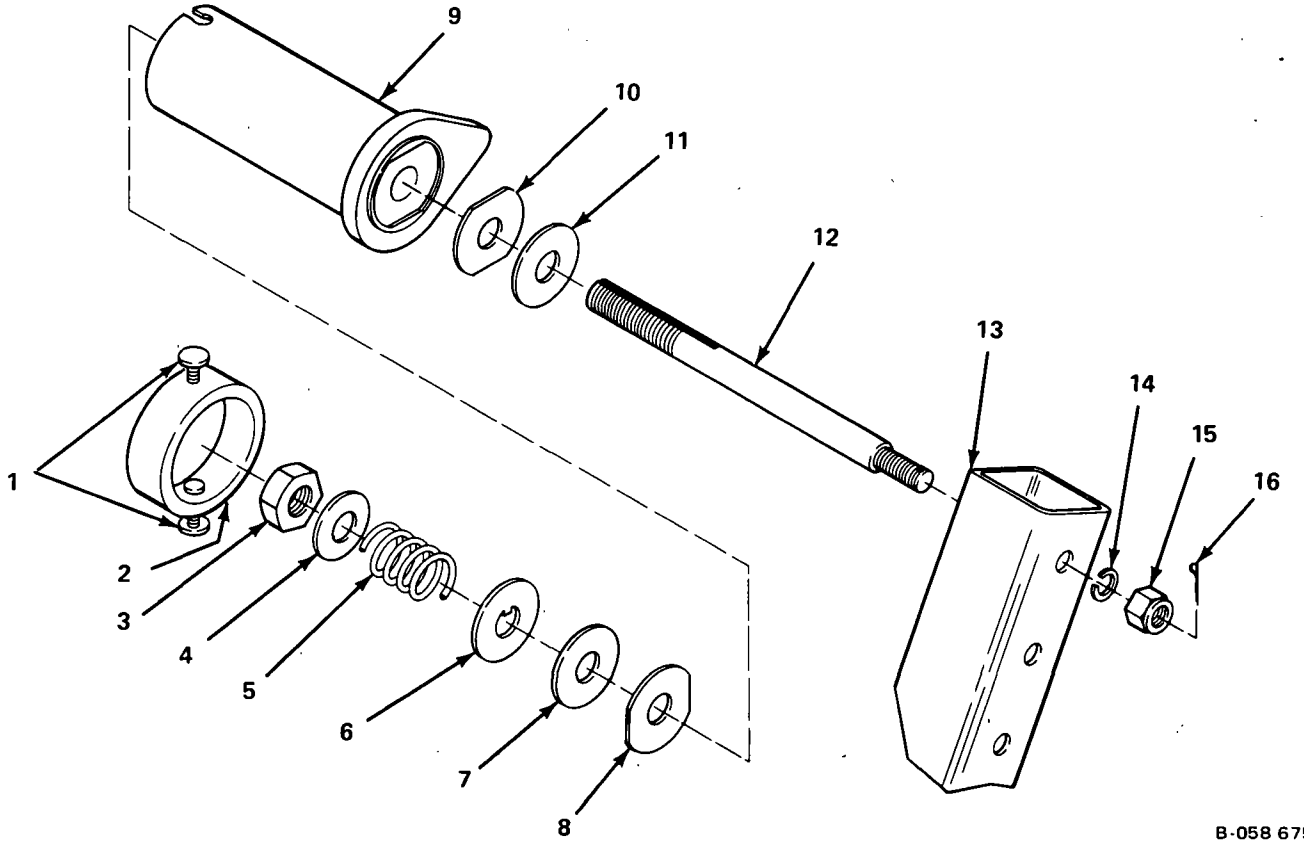
   E. Fiber washer (7)

   F. Keyed washer (6)

   G. Spring (5)

   H. Flat Washer (4)

4. Rotate hex - nut (3) onto support shaft (12). Hex - nut (3) should be rotated only until a slight drag is felt while turning spindle (12).

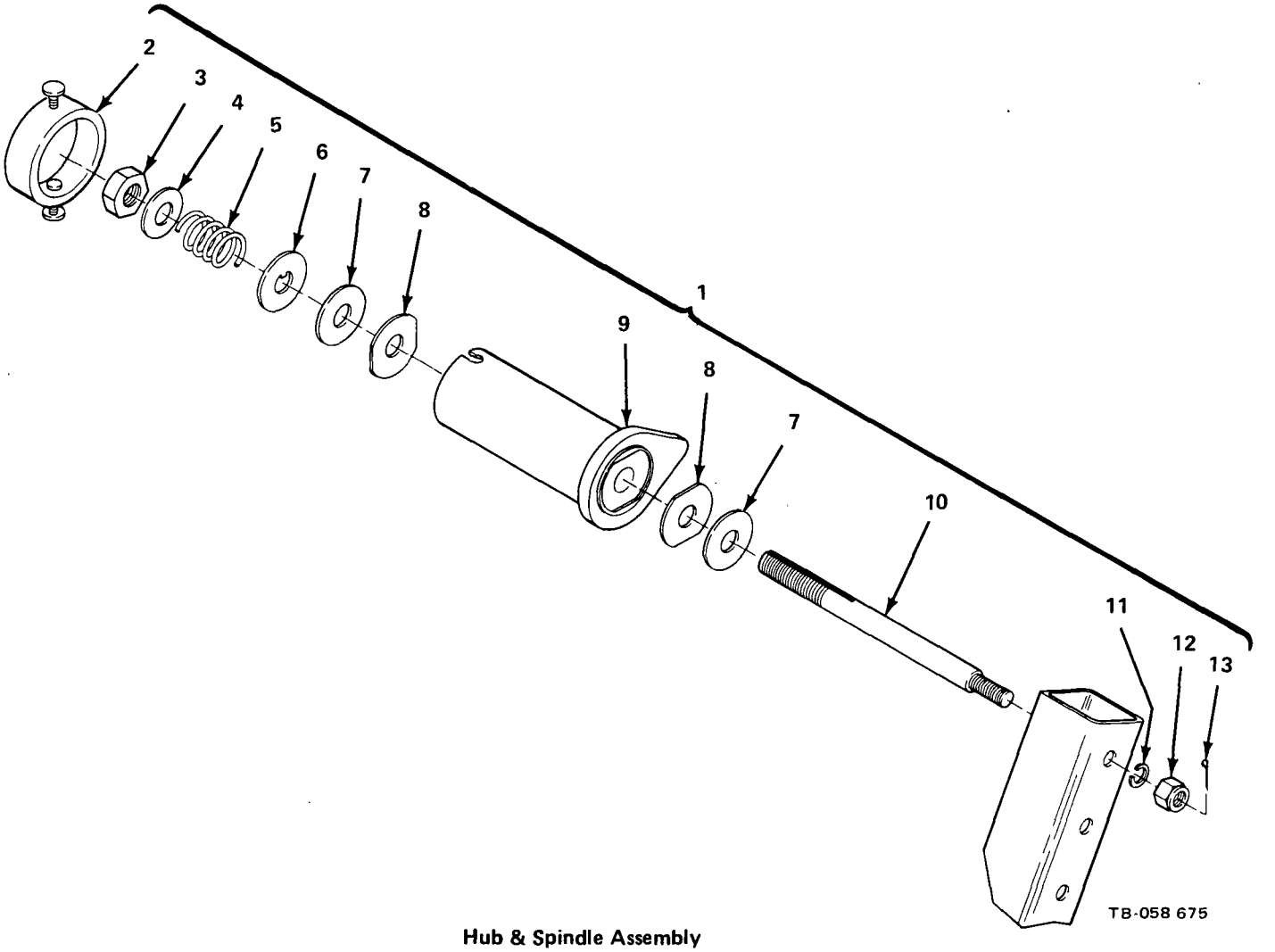


B-058 675

Effective with serial No. HE741584 an alternate Hub & Spindle Assembly has been used. If the Control/Feeder is equipped with an aluminum hub refer to the parts breakdown in the parts list. If the Control/Feeder is equipped with a plastic hub use the parts breakdown on this errata sheet.

Item No.	Factory Part No.	Description	Quantity
1	058 675	HUB & SPINDLE ASSEMBLY (consisting of)	1
2	058 427	. RING, retaining - spool	1
3	601 884	. NUT, steel - hex jam 5/8-11	1
4	605 941	. WASHER, flat - steel 41/64 ID x 1OD	1
5	010 233	. SPRING, compression	1
6	057 971	. WASHER, flat - steel keyed 1-1/2 dia	1
7	010 191	. WASHER, fiber 5/8 ID x 1-1/2OD x 1/8	2
8	058 628	. WASHER, steel - brake	2
9	058 428	. HUB, spool - plastic	1
10	057 618	. SHAFT, support - spool	1
11	602 213	. WASHER, lock - steel split 3/8	1
12	605 181	. NUT, steel - self locking hex 3/8-16	1
13	605 277	. PIN, cotter 3/32 x 3/4	1

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.



Hub & Spindle Assembly

SECTION 1 - INTRODUCTION

1-1. GENERAL

The purpose of this manual is to provide the basic information required to install, operate and maintain the control/feeder. This manual will restrict itself mainly to the wire control/feeder and its optional equipment. For specific information on its gun or torch, refer to the respective manual.

1-2. DESCRIPTION

The control/feeder is of the constant wire feed speed type and is designed to be used in conjunction with a CP (Constant Potential) type of welding power source.

This unit was designed to handle .030" to 3/32" mild and low alloy solid wires and .045" to 1/8" flux cored wires. Either the short circuiting method of transfer or the spray type arc may be utilized.

The control/feeder comes from the factory equipped with a 30 tooth fiber gear on the motor and a 24 tooth steel gear on the drive. This combination will provide up to 550 ipm. A 24 tooth fiber and 15 tooth steel gear may be ordered as optional equipment to provide the flexibility of the seven different wire feed speed ranges.

This control/feeder is a heavy duty wire feeding unit combining both the wire feeder and the control in a compact assembly. It contains all the controls and equipment needed to supply welding wire, shielding gas and coolant (optional) to the welding gun or torch. This unit consists basically of a control assembly, a drive motor with reductional gear box assembly, drive roll assembly, wire guides and a spindle and hub assembly to accommodate a reel assembly for handling wire coils or spool assembly for handling wire spools.

The control assembly contains a solid state type speed control for providing precise regulation of motor speeds over a wire feed range of 15 to 850 ipm. To prevent override or run out of the wire at the torch or gun tip, the wire feed speed control provides dynamic breaking of the motor when the switch on the gun or torch is released. Circuitry and plumbing to provide control of the shielding gas flow to the torch or gun is also incorporated in the control assembly.

The control unit requires 115 volt 60 hertz ac from the welding machine or external source for operation. This 115 volt ac source is connected to the control assembly and is fed back through a 115/24 volt step down transformer and the contactor control receptacle to actuate a contactor. The contactor may be either the primary type or secondary type as long as it can be actuated by applying 115 volt ac to the contactor coil.

The step down transformer incorporated in the control assembly provides a low voltage (24 volts) across the torch or gun switch to control the operation of the welding power source and the wire feed.

Hanging Bail (Optional), Part No. 056 716, has two position adjustment for balancing suspended control/feeder over work area. See Optional Equipment section.

The control/feeder also has facilities for accommodation of a remote control. The remote control unit may be ordered as optional equipment.

For particulars on control/feeder refer to the Specifications (Figure 1-1).

1-3. SAFETY

Before attempting to make primary or secondary connections, change parts or make repairs, be sure the power source and control/feeder equipment is completely disconnected from the main power line.

Refer to the safety section under OPERATION and the complete safety section in the Power Source Instruction Manual "SAFETY RULES FOR OPERATION OF ARC WELDING MACHINES".

ELECTRODE WIRE DIA. CAPABILITY	ELECTRODE WIRE FEED SPEED	CONTROL CIRCUIT POWER AT TORCH	DIMENSIONS			WEIGHT	
			HEIGHT	WIDTH	LENGTH	NET	SHIPPING
Fraction .030" - 1/8" Decimal .031 - .126 Metric .8MM - 3.2MM	15 to 850 ipm.	24 volt	24-1/2"	14 5/8"	34-1/4"	66	71

Figure 1-1. Specifications

SECTION 2 - INSTALLATION

2-1. LOCATION

Refer to Figure 2-1 for dimensional information on the wire control/feeder. Lead lengths must be considered when installing the control/feeder. If the welding machine can be located near the work area, the control/feeder can usually be installed on top of the welding machine. Suitable space should be allowed for making necessary connections.

2-2. DRIVE MOTOR AND GEAR HOUSING (Figure 2-2)

The red stop, which is inserted into the hole in the vented oil fill plug, must be removed prior to operation of the control/feeder. See Figure 2-2 for the location of the red stop.

The oil level should be checked before the unit is put into operation and periodically thereafter. To check oil level in the GEAR HOUSING, remove the OIL LEVEL PLUG in the GEAR HOUSING END SHIELD ASSEMBLY and add SAE No. 90 oil, if necessary, until oil runs out the OIL LEVEL HOLE.

2-3. GAS CONNECTIONS FROM SUPPLY TO CONTROL/FEEDER (Figure 2-5)

Determine the distance the control/feeder is to be located from the welding machine and then connect

a hose from the gas regulator-flowmeter on the shielding gas supply to the GAS IN connection on the rear of the control/feeder control panel. This connection has a right hand thread.

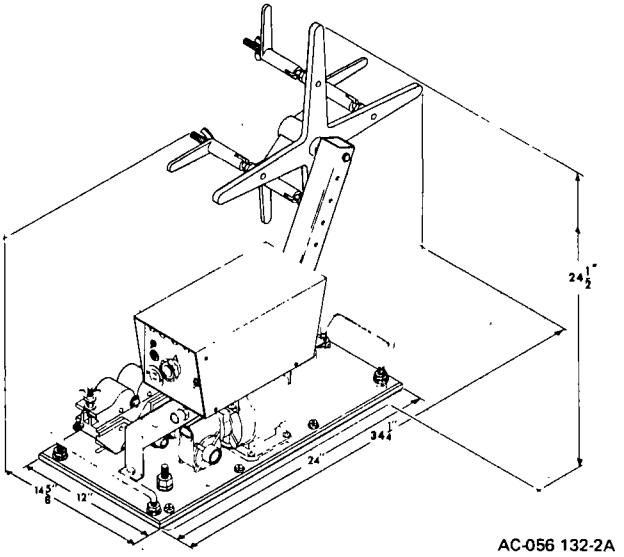


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Figure 2-1. Control/Feeder Dimensions

2-4. WATER CONNECTIONS FROM SUPPLY TO CONTROL/FEEDER (Figure 2-3 & 2-4)

The Water Cooling Kit (Part No. 056 351) is available as optional equipment. When a water cooled torch is used, connect a hose from the water supply to the WATER IN male connection on the rear of the control/feeder control panel. This connection has a left hand thread.

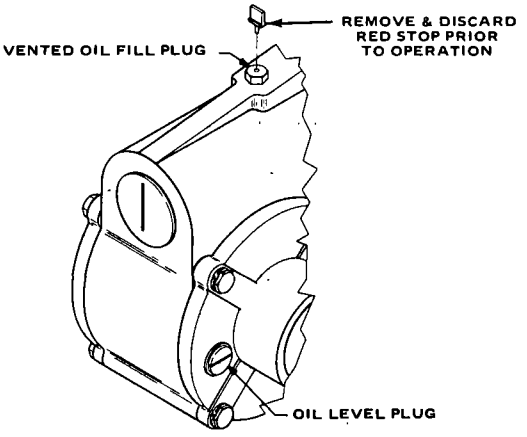

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Figure 2-2. Vented Oil Plug And Oil Level Plug

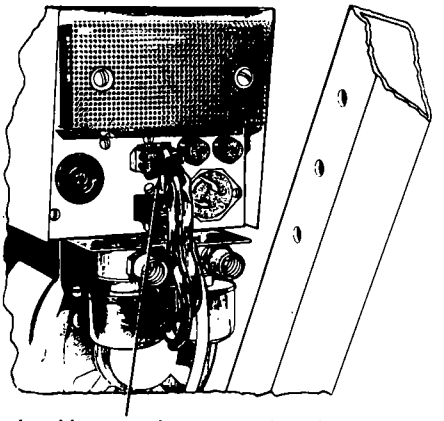

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Figure 2-3. Water Coolant Kit Connections

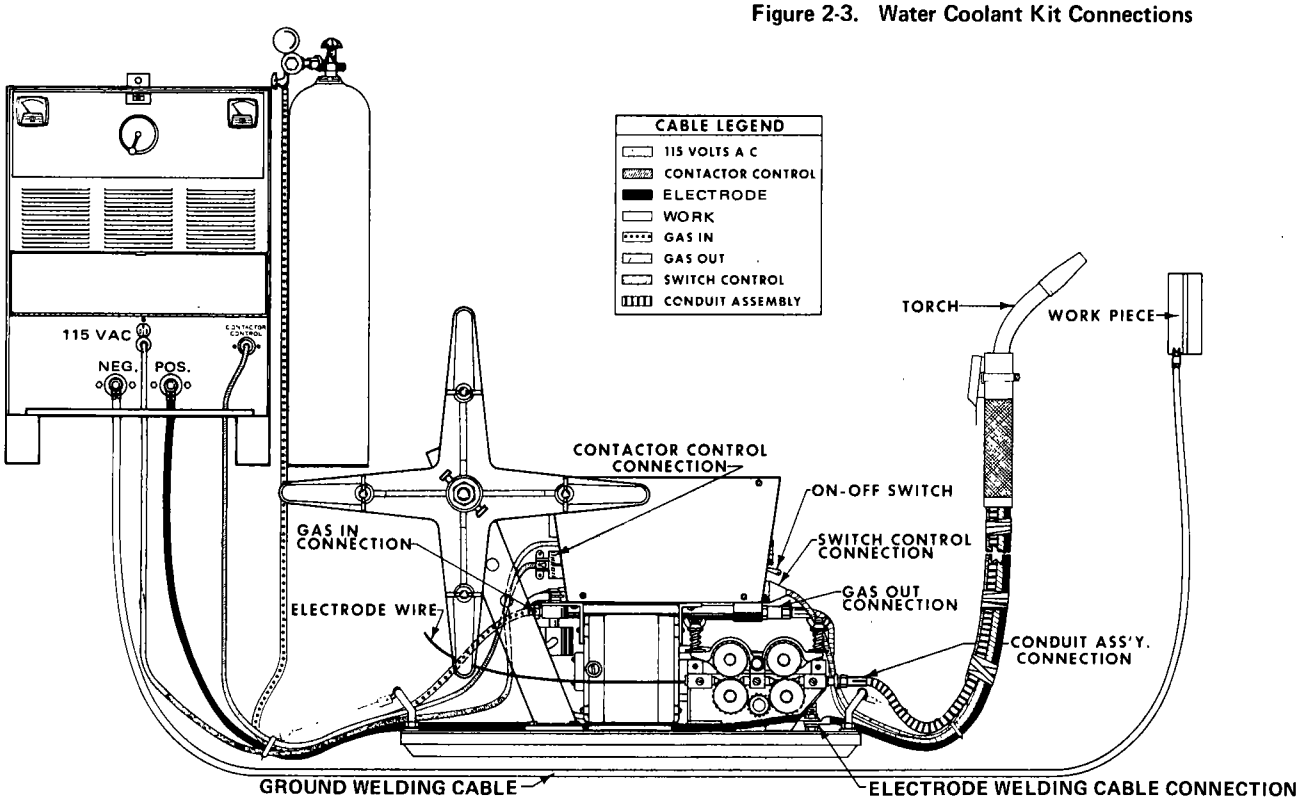

Figure 2-4. Control/Feeder Interconnection Diagram

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If field installation of the WATER COOLING KIT is required, follow the steps below:

1. The Water Cooling Kit mounts underneath the Control Assembly.
2. Remove the coupling from the torch end of the water outlet pipe and from the rear of Control Assembly, insert the pipe end of the Water Coolant Kit through the holes provided on the Control Assembly Supports opposite the shielding gas solenoid and fittings.
3. Two holes are provided in the bottom panel which match with the two holes in the bottom of the solenoid valve. Fasten the WATER COOLING KIT to the bottom panel with two 10-32 x 1/4 screws.
4. Remove the six prong plug (to which the gas solenoid leads are connected from the receptacle in the rear panel of the control. Remove the pin which holds the cover to the base of the plug.
5. Loosen the strain relief clamp screws and remove the tape from the leads.
6. Dress the two leads from the water solenoid up to the six prong plug and through the strain relief clamp.
7. Connect and solder separately one lead to plug terminal number 3 and the other lead to plug terminal number 5. (Figure 2-3)
8. Replace the plug cap and pin removed in step 2-4. 4.
9. Thread the coupling removed in step 2-4. 2. onto the water inlet pipe along with the rest of the fittings.
10. Connect a hose from the WATER TO DRAIN connection and connect the other end to a water drain or if a water coolant circulating system is used, connect the water drain end to the return inlet on water coolant system.

2-5. 115 VOLT AC RECEPTACLE CONNECTIONS (Figure 2-4 & 2-5)

Make up a 16/3 conductor cable long enough to reach from the welding machine to the control/feeder. The control/feeder is supplied with necessary female plug which must be attached to one end of the three conductor cable. Connect this cable to the 115 volt ac receptacle on the welding machine and to the 115 volt ac receptacle on the rear panel of the control/feeder.

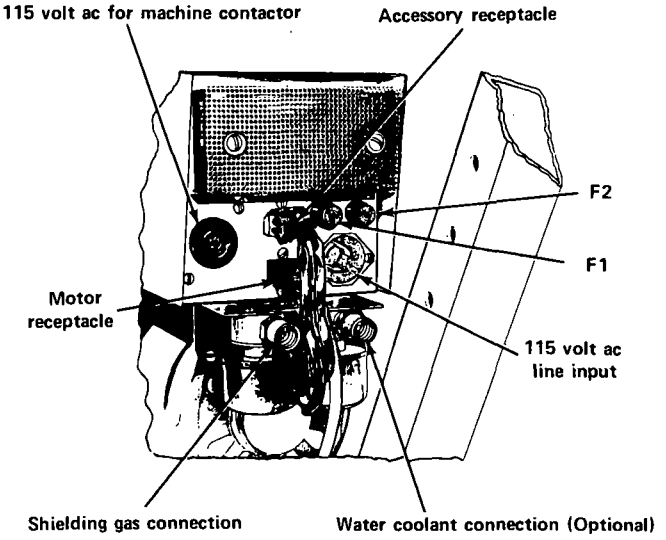

Figure 2-5. Rear Panel Of Control Assembly

2-6. WELD CONTACTOR CONTROL CONNECTIONS (Figure 2-4)

Make up a 16/2 conductor cable the same length as the 115 volt ac three conductor cord.

The control/feeder is supplied with the necessary male plug which must be attached to one end of the two conductor cord. Connect this cable to the CONTACTOR CONTROL receptacle on the welding machine and to the female receptacle on the rear panel of the control/feeder.

TABLE 2-1. Cable Size For Gas Metal-Arc (MIG) Welding

AMPERES	MAX. CABLE LENGTH	CABLE SIZE
200	15 Feet	No. 1
300	15 Feet	No. 2/0
400	15 Feet	No. 3/0
500	15 Feet	No. 4/0
600	15 Feet	No. 2-2/0

If longer cable is required, double the size of cable listed.

2-7. POWER SOURCE WELD CONNECTIONS (Figure 2-4 & 2-6)

Make a length of welding cable of suitable size (See Table 2-1 for welding cable size) long enough to reach from the welding machine to the electrode welding cable connector assembly on the control/feeder.

Connect a lug of suitable current rating having 9-1/2 inch diameter hole to one end of this cable and a large enough diameter hole lug on the other end of this cable to fit the POSITIVE (+) secondary terminal on the welding machine. This connection is for reverse polarity welding.

Connect the electrode cable to the POSITIVE secondary terminal on the welding machine. Connect the other end to the ELECTRODE WELDING CABLE CONNECTOR ASSEMBLY on the control/feeder, but do not tighten as the electrode cable from the Gun or Torch will also be connected to this terminal. Make up a welding cable of proper size and of suitable length (see Table 2-1) to reach from the welding machine to the workpiece. Attach to one end of this cable a suitable diameter hole lug and connect to the NEGATIVE (-) terminal on the welding machine. Attach to the other end of the cable a "C" type clamp and make a good solid connection to the workpiece.

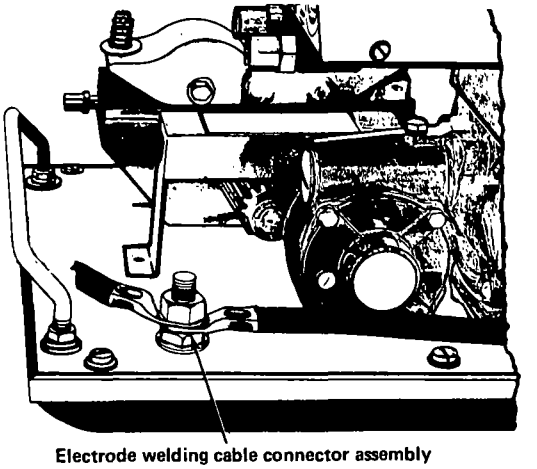

Figure 2-6. Power Source Connection

2-8. WIRE SPEED REMOTE CONTROL (Optional) (Figure 2-7)

The control/feeder, comes equipped with facilities to accommodate remote control of wire speed. The Remote Control unit may be obtained as optional equipment.

To install the unit, insert the Remote Control Plug into the receptacle on the face of the Control/feeder.

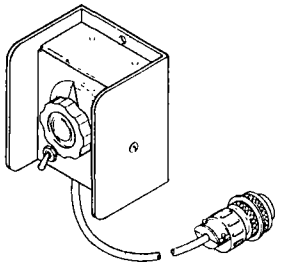

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Figure 2-7. Remote Control Unit

2-9. PREPARATION OF CONTROL/FEEDER

On new equipment, or as a result of wire size changes, it is necessary to install the required speed change gears, drive roll gears, and wire guides to accommodate the particular wire size and thread the welding wire. Having selected the desired wire size and related parts, proceed to the following installation and adjustment.

A. Speed Change Gears (Figure 2-8) (TABLE 6-6 Page 13)

The selection of the proper gear combination is important in obtaining the ultimate in performance of the control/feeder. With the proper gear combination a finer wire feed speed adjustment can be made and the drive motor will deliver maximum power. The feeder may be used at any setting on the control/feeder where an adequate feeding condition can be obtained. It is recommended that the drive motor not be operated consistently at a wire feed speed less than a 30 percent setting on the control/feeder. Operation with a setting of less than 30 percent when using large diameter electrode wire, may result in a high current draw by the motor causing the circuit breaker to activate. Also, operation on the lower 30 percent of the control may not provide an acceptable wire feed speed adjustment. Selecting gear combinations, so the feeder will function as high as possible on the control/feeder setting, will give the best operating conditions. Table 6-6 A through G are provided to aid in the selection of the proper gear sizes.

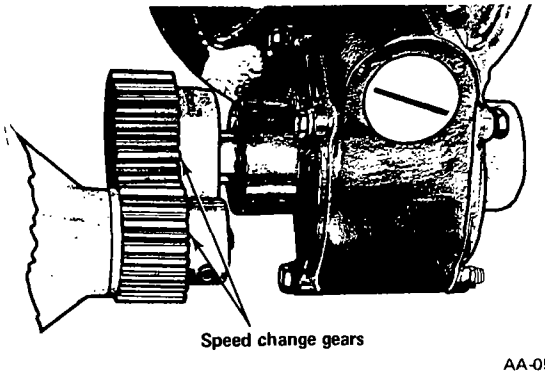

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Figure 2-8. Location Of Speed Change Gears

B. Changing Speed Change Gears

Change the Speed Change Gears as follows:

1. If speed change gear changing is necessary, remove the speed reduction gear cover by removing the two 1/4 inch screws.
2. Loosen the two bolts fastening the Drive Roll Assembly to the base of the control/feeder.
3. Slide the drive roll assembly forward.
4. Remove the speed change gear from the Drive Roll Assembly.
5. Remove the speed change gear from the drive motor gear box assembly shaft.
6. Refering to Table 2-2 for proper gears, install gears on drive motor gear box assembly, drive shaft and on the Drive Roll Assembly drive shaft. Tighten set screws on each speed change gear.

IMPORTANT

The control/feeder uses a fiber and a steel gear in the drive train between the drive motor and the wire drive rolls. Proper clearance between the fiber and steel gear is important. The proper clearance is .007 inch. This is approximately the same thickness of two sheets of standard writing paper. The easiest method to obtain the proper alignment is to be sure the motor is fastened securely to the base plate. Then insert a piece of .007 thick paper (or two thicknesses of standard writing paper) between the fiber and steel gear, check the alignment of the gears (the two gears must be running in a straight line) and then tighten down the drive roll assembly. If this proper clearance is not maintained in the gears, they may wear severely, bind and cause erratic wire feed, or even break.

7. Re-install the speed change gear cover over the gears.

TABLE 2-2. Gear Sets For Various Wire Feed Speeds

GEAR SET	MOTOR GEAR NO. OF TEETH	DRIVE GEAR NO. OF TEETH	MIN. SPEED CONTROL SETTING	MAX. SPEED CONTROL SETTING
A	15 Steel (056 094)	30 Fiber (056 093)	20 ipm	225 ipm
B	15 Steel (056 094)	24 Fiber (056 092)	25 ipm	280 ipm
C*	24 Steel (056 095)	30 Fiber (056 093)	35 ipm	370 ipm
D	24 Fiber (056 092)	24 Steel (056 095)	45 ipm	450 ipm
C*	30 Fiber (056 093)	24 Steel (056 095)	50 ipm	550 ipm
B	24 Fiber (056 092)	15 Steel (056 094)	79 ipm	745 ipm
A	30 Fiber (056 093)	15 Steel (056 094)	90 ipm	900 ipm

*Standard Gear Set

Do not use 2 fiber or steel gears together.

C. Drive Roll Gears & Wire Guides (Figure 2-9)

After determining the wire size to be used, select the proper drive roll gears and wire guides from Table 2-3 and install them as follows:

1. Remove the four drive roll gear securing bolts and their respective washers from the drive roll gears and remove the drive roll gears from the drive roll assembly.
2. Loosen the inlet, intermediate, and outlet guide securing screws and remove all three wire guides.

NOTE

To prevent the three wire guides from slipping ensure that the flat side of the wire guide is facing the securing screw.

3. Install the three new wire guides and secure the wire guide securing screws.
4. Slide the new drive roll gears onto the drive roll gear shaft and secure drive roll gears with the four washers and bolts removed in step 1.

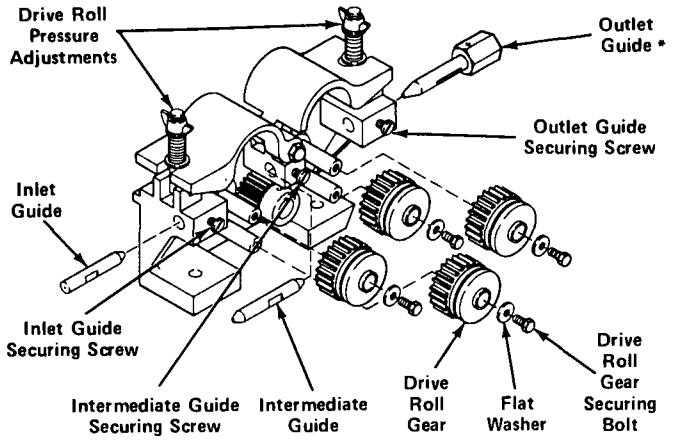

Figure 2-9. Drive Roll Assembly

D. Installing Reel Type Welding Wire (Figure 2-10)

Install Reel Type Welding Wire as follows:

1. Loosen the four wing nuts on the wire reel, and pull out and turn the four fingers toward the center of the wire reel. (Figure 2-10)
2. Place coil of wire onto the wire reel fingers so the wire will pay off from the bottom of the coil in a counterclockwise direction.
3. Turn two opposite wire reel fingers outward. Do the same with the two remaining opposite wire reel fingers.

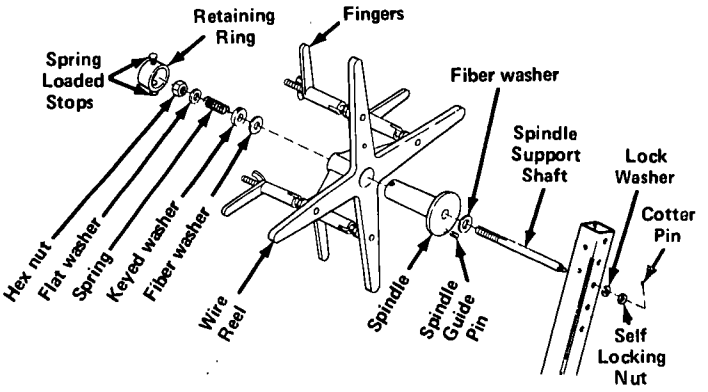

Figure 2-10. Installing Welding Wire

E. Installing Spool Type Welding Wire (Figure 2-10)

1. Simultaneously depress the two spring loaded stops on the retaining ring and slide the retaining ring off of the spindle.
2. Slide the reel off of the spindle.
3. Slide the spool of wire onto the spindle so that the welding wire will pay off from the bottom of the spool of wire in a counterclockwise direction.
4. Rotate the spool until the hole in the spool aligns with the guide pin on the spindle. Slide the spool onto the spindle until it seats against the back side of the spindle.
5. Depress the two spring loaded stops on the retaining ring and slide the retaining ring onto the spindle.

Table 2-3. Wire Drive Roll Gears And Wire Guides For Various Wire Sizes

Control/ Feeder	Wire Diameter and Type			Kit No.	Gear Drive Roll		Guide Part Numbers	
	Fraction	Decimal	Metric		Part No.	Type	Inlet	Intermediate
058 484	.030" hard	.030	.8MM	058 500	058 516	V-Groove	056 192	056 206
058 485	.035" hard	.035	.9MM	068 501	058 517	V-Groove	056 192	056 206
058 486	.045" hard	.045	1.2MM	068 502	058 518	V-Groove	056 193	056 207
058 487	.052" hard	.052	1.3MM	058 503	058 482	V-Groove	056 193	056 207
058 488	1/16" hard	.062	1.6MM	058 504	058 519	V-Groove	056 195	056 209
058 489	.045" hard & cored	.045	1.2MM	058 505	058 520	U-Groove	056 193	056 207
058 490	1/16" hard & cored	.062	1.6MM	058 506	058 521	U-Groove	056 195	056 209
058 491	5/64" hard & cored	.078	2.0MM	058 507	058 522	U-Groove	056 195	056 209
058 492	3/32" hard & cored	.093	2.4MM	058 508	058 523	U-Groove	056 196	056 210
058 493	7/64" hard & cored	.109	2.8MM	058 509	058 524	U-Groove	056 196	056 210
058 494	1/8" hard & cored	.125	3.2MM	058 510	058 525	U-Groove	056 197	056 211
058 495	1/16" cored	.062	1.6MM	058 511	058 526	V-Knurled	056 195	056 209
058 496	5/64" cored	.078	2.0MM	058 512	058 527	V-Knurled	056 195	056 209
058 497	3/32" cored	.093	2.4MM	058 513	058 528	V-Knurled	056 196	056 210
058 498	7/64" cored	.109	2.8MM	058 514	058 529	V-Knurled	056 196	056 210
058 499	1/8" cored	.125	3.2MM	058 515	058 530	V-Knurled	056 197	056 211

Outlet guide is furnished with torch assembly.

F. Adjusting Hub Tension

To adjust hub tension, slowly unwind wire and pull end toward the drive roll gears to check hub tension, wire should unwind freely, but hub tension should be sufficient to keep it taut and prevent backlash when drive motor is stopped. If adjustment is required, loosen or tighten nut on the end of the hub shaft.

G. Threading The Welding Wire (Figure 2-9 and 2-11)

Proceed as follows to thread welding wire:

1. Loosen the wing nuts on the drive roll assembly, turn the pressure adjustment studs downward and lift the upper drive rolls upward.
2. Straighten or cut off the free end of the wire and pass it through the inlet wire guide in the drive roll assembly.
3. Continue the wire through the intermediate and outlet guides.
4. Tip the upper drive roll gears downward making sure the upper drive gears mesh with the lower drive gears.
5. Bring the drive roll pressure adjustment studs upward making sure the lower washer comes above the upper drive roll assemblies.
6. Turn the pressure adjustment wing nut in the clockwise direction until the drive roll gears are tight against the welding wire. Do not tighten too tight. Further adjustments can be made after the welding machine and control/feeder are put into operation.
7. Connect the torch or gun to the control/feeder according to instructions in Torch or Gun Manual.
8. Place the control/feeder power switch in the ON position.
9. Place the RETRACT-FEED Switch in the FEED position. (Figure 3-1)
10. Push the INCH Switch in the upward direction. This will run the wire through the torch or run without energizing the welding machine welding circuit. If wire slippage occurs between drive rolls, tighten Pressure Adjustment Wing Nuts until slippage stops. If wire is run out beyond the torch or gun tip, place the RETRACT-FEED Switch in the RETRACT position and push the INCH switch in the upward position. Release INCH switch after end of wire is approximately one inch from the end of the torch or gun tip. Be sure to RETURN RETRACT-FEED switch to the FEED position.

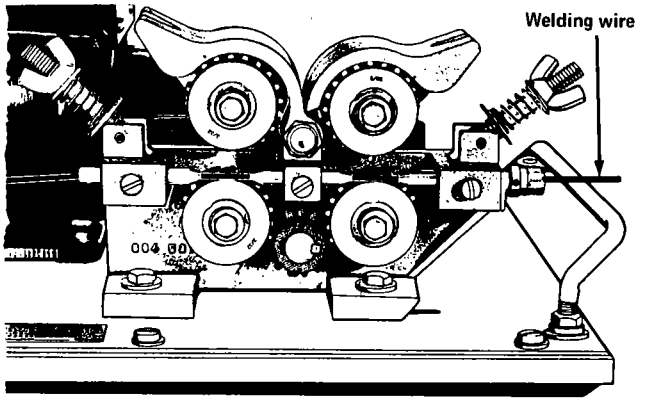

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Figure 2-11. Threading Welding Wire

SECTION 3 - OPERATION

3-1. SAFETY REQUIREMENTS

Comply with all ventiation, fire and other safety requirements for welding as established for industrial applications. Reference as applicable:

1. Safety Rules for Operation of Arc Welding Machines - See Arc Welding Machine Instruction Manual.
2. Safety In Electric and Gas Welding and Cutting Operations - See American Standards Association: Bulletin Z49.1, 1958.
3. Recommended Safe Practices for Inert-Gas Metal-Arc Welding - See American Welding Society: Bulletin A6.1, 1958.

Because of infra-red radiation emitted by the high-density arc in Gas Metal-Arc Welding methods, FLASH GOGGLES (medium-shade) are recommended in addition to HELMETS for the operator and near-by personnel. The welding wire (electrode) and all metal parts in contact with it are electrically energized while welding, thus requiring periodic inspection for broken insulation, water leakage (if used) and other electrical hazards.

CAUTION

Whenever steps are taken to remove and repair such hazards, place all power controls OFF and disconnect all electrical cabling from the welding machine.

3-2. PRE-WELD REQUIREMENTS

Prior to welding, ensure the following procedures are accomplished.

A. Gas And Water Supply (Figure 3-1)

Connect gas and water supply as follows:

1. Inspect all hose and cabling connections for secure fittings.
2. If interconnections are complete and satisfactory, place the gun or torch in a safe location where the exposed welding wire (electrode) will not touch anything.
3. Place the welding machine power switch in the ON position.
4. Open the valve on the gas cylinder.
5. Turn the water coolant supply ON (if used).
6. Push the PURGE button and adjust gas flow regulator. Hold the button in for a few seconds, long enough to remove the air from the shielding gas supply line.

NOTE

When installing new equipment, or after prolonged shutdown, allow shielding gas to flow continuously for at least one minute prior to welding in order to purge the gas line.

7. Inspect water drain hose (if used) . . . there should be no leakage at gland fittings and used

water should be observed as flowing steadily out to sewer.

8. If a water circulating coolant system is used, check water fittings to gun or torch and for water flow at the Water Return on the water coolant system.

B. Wire Speed Control (Figure 3-1)

The adjustment of this control is best determined by the individual operation; difference between applications, materials and desired end-results will require feeding rates that vary from one application to another. Wire feed speed adjustment is made by means of the WIRE SPEED control on the front panel of the control assembly. Turning the control in the clockwise direction will increase the wire feeding rate and will supply more wire into the arc and deposit a larger weld puddle.

The wire speed may also be adjusted by a remote control (optional). Connect the remote control plug into the remote control receptable on the face of the control/feeder and position the STD-REMOTE Switch on the control/feeder and on the remote control unit to the REMOTE position. If it is desired to return the control of the wire speed to the control/feeder, place either the STD.-REMOTE Switch on the control/feeder or the one on the remote control to the STD. position.

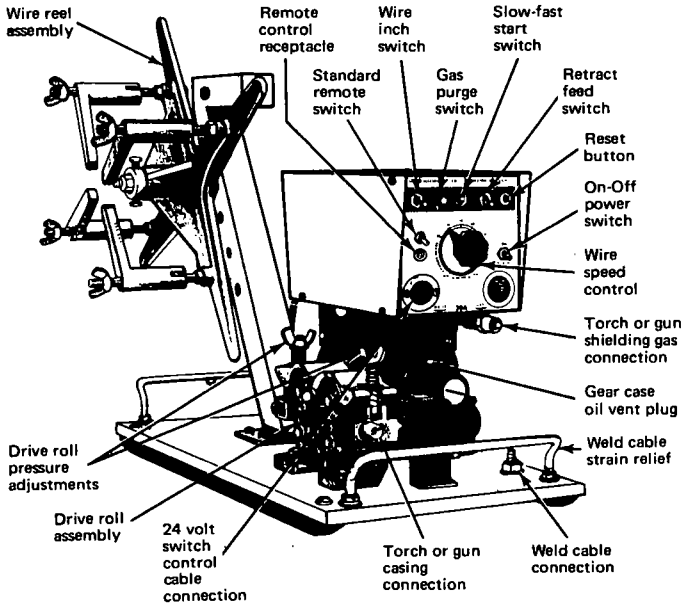


Figure 3-1. Wire Control/Feeder Panel

C. Pre-Weld Check List

Prior to welding, ensure the following are accomplished:

1. All safety requirements are known and in effect.
2. Electrical power controls are OFF.
3. All hose and cabling is in good condition; connections are properly secured.
4. Shielding gas is provided and the source is adjusted for proper flow-rate.
5. If used, water circulating coolant source output is adjusted; used water flow is visible to drain or coolant system.
6. Wire spool is in place and adjusted for proper pay off tension.
7. Correct size wire drive fittings are installed on control/feeder and gun or torch.
8. Wire is firmly seated between drive roll gears with sufficient pressure to push the wire through the gun or torch.
9. Wire feeding rate has been preset on WIRE SPEED control.
10. RETRACT-FEED Switch is in FEED position.
11. SLOW-FAST START switch is in proper position. Having the switch in the SLOW position will reduce the speed of the wire for a few starting cycles which will act as a hot start feature.
12. All power cables are safety insulated and properly interconnected between control/feeder and gun, welding machine, and primary power source.
13. Ground cable is properly connected between workpiece and welding machine negative secondary output terminal.
14. Welding machine is adjusted for required output.
15. If all pre-weld requirements have been satisfied for control/feeder and gun, all required power controls are now positioned to ON, the operator may proceed with the trial or actual welding.

CAUTION

The welding wire and all metal parts in contact with it are energized while welding. Do not touch the welding wire or any metal part making contact with it.

3-6. GAS METAL-ARC (GMAW) WELDING

When performing gas metal-arc welding proceed as follows:

1. Place the ON-OFF power switch on the control/feeder in the ON position.
2. Place the ON-OFF power switch on the welding machine in the ON position. This will energize the welding machine and control/feeder.
3. Hold the tip of the gun or torch approximately 1/2 inch from the workpiece.
4. Energize the trigger on the gun or torch handle. Gas will start to flow and wire will start to feed if drive roll pressure is properly adjusted to prevent slippage. If wire slippage is noticed, tighten PRESSURE ADJUSTMENT NUTS 1/4 turn clockwise at a time until slippage stops. Do not tighten PRESSURE ADJUSTMENT NUTS too much.
5. Gas flow will start approximately 30 cycles (1/2 second) before the wire starts.
6. After all the controls on the equipment are adjusted for normal operating conditions, the control/feeder and welding machine will perform their duties automatically.
7. Release the torch switch after the weld is completed.

3-7. SHUTDOWN PROCEDURES

Environmental conditions and safety requirements will determine extent of equipment shutdown between operation. Shutdown equipment as follows:

1. Shutdown welding power source.
2. Place the ON-OFF switch on the control/feeder in the OFF position.
3. Turn off gas valve at source.

4. If used, turn off water supply and blow out water lines with compressed air. If a water circulating coolant system is used where the temperature may possibly fall below the freezing point, add sufficient anti-freeze to the coolant system tank and operate the coolant system long enough to properly mix the anti-freeze with the water.

SECTION 4 - MAINTENANCE

4-1. INSPECTION AND UPKEEP

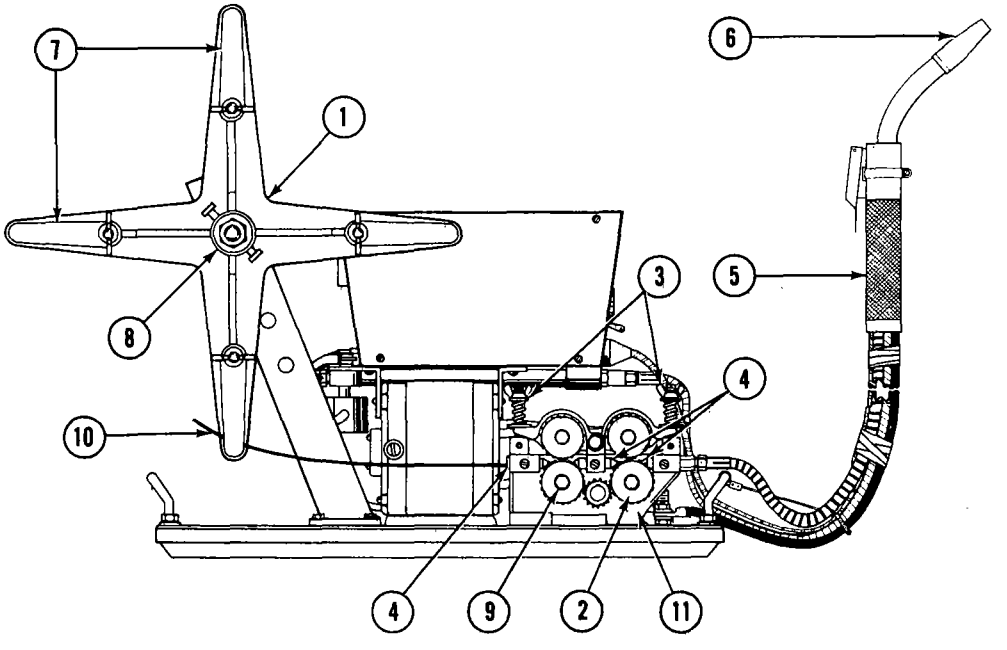
Usage and shop conditions will determine frequency and type of maintenance. Inspect equipment as follows:

1. Make sure welding machine power switch is OFF.
2. Inspect torch for broken areas, cracks and loose parts: tighten, repair and replace as required.
3. Carefully remove any weld spatter of foreign matter which may accumulate around the nozzle orifice. Use a hardwood stick, never a metal tool.
4. Repair or replace, as required, all hose and cable; give particular attention to frayed and cracked insulation and areas where it enters equipment.
5. Remove grease and grime from components; moisture from electrical parts and cable.
6. Blow out the casing with compressed air when changing wire. This will remove any metal chips and dirt that may have accumulated.

4-2. CHANGING WIRE SIZE (Figure 4-1)

Each time the wire size is changed, the gun or torch and control/feeder must be adapted for use with the new size wire. This consists of changing the wire contact components in the gun or torch and the drive roll gears and guides in the control/feeder. For proper gun or torch wire guide components, refer to appropriate gun or torch manual. To adapt the gun and torch and control/feeder for the new wire size, proceed as follows:

1. Position all power switches to OFF.
2. Cut four 15 inch pieces of wire (10) and tie around the wire coil between each reel finger (7). This is to prevent the wire from unraveling when the coil or wire is removed from either the wire reel assembly (1) or hub assembly (8).
3. Grasp the wire close to spool to prevent from unwinding. Cut the welding wire (10) between where the wire is grasped and where it enters the drive roll assembly (11).
4. Tie the wire (10) to the edge of wire coil or spool (1) and remove coil or spool from control/feeder.
5. Loosen the pressure adjustment wing nuts (3) by turning in counterclockwise direction.
6. Remove welding wire (10) from torch (5) (or gun) and drive roll assembly (11).
7. Select the correct wire size drive roll gears (2) and wire guides (4) from Table 2-3.
8. Remove the drive roll gears (2) from the drive roll gear shaft (9).
9. Remove the wire guides (4) from drive roll assembly (11) and replace with proper wire guides (4) from Table 2-3.
10. Install proper drive roll gears (2).
11. Remove gas nozzle (6) from end of torch (5) (or gun).
12. Refer to Torch or Gun Manual for proper components. Install or replace torch or gun components as required.
13. Replace gas nozzle (6).
14. Refer to paragraph 2-9. G. for Installation and Threading procedures of new wire size.

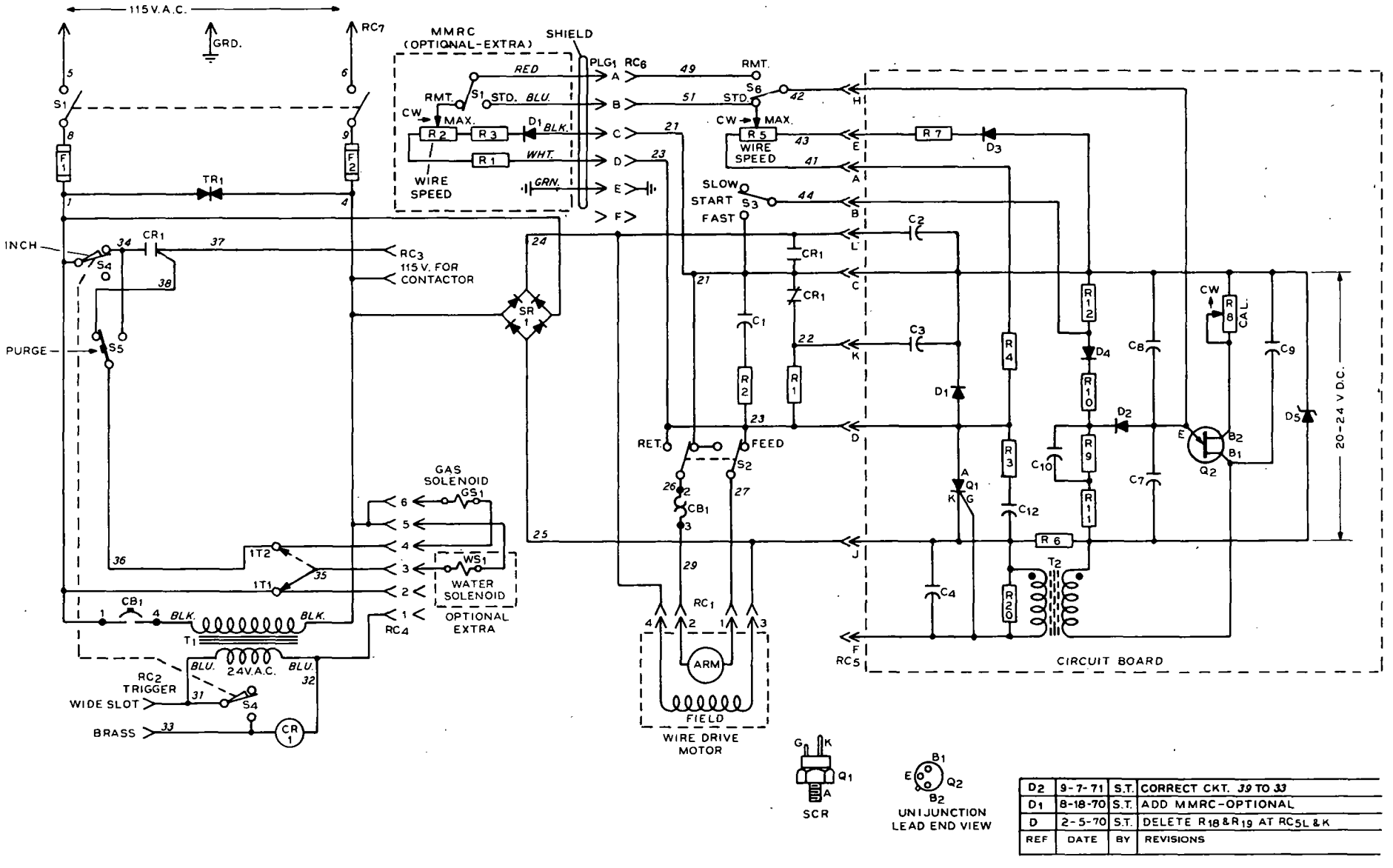


LEGEND

1. Wire Reel Assembly
2. Drive Rolls
3. Pressure Adjustment Wing Nuts
4. Wire Guides
5. Torch
6. Gas Nozzle
7. Reel Fingers
8. Hub Assembly
9. Drive Roll Gear Shaft
10. Electrode Wire
11. Drive Roll Assembly

AC-056 132-10A

Figure 4-1. Changing Wire Size



REF	DATE	BY	REVISIONS
D2	9-7-71	S.T.	CORRECT CKT. 39 TO 33
D1	8-18-70	S.T.	ADD MMRC-OPTIONAL
D	2-5-70	S.T.	DELETE R_{18} & R_{19} AT RC_{5L} & K

Figure 4-2. Circuit Diagram

Circuit Diagram
No. CB-056 132-1D2

SECTION 5 - TROUBLE SHOOTING

TROUBLE SHOOTING GAS METAL-ARC WELDING PROCESSES AND EQUIPMENT

INTRODUCTION

When troubleshooting gas metal-arc welding process and equipment problems it is well to isolate and classify them as soon as possible into one of the following categories:

1. Electrical 2. Mechanical 3. Process

This eliminates much needless lost time and effort. The data collected here dicusses some of the common problems of gas metal-arc welding processes. A little thought will probably enable solving the particular problem through the information provided.

The assumption of this data is that a proper welding condition has been achieved and has been used until trouble developed. In all cases of equipment malfunction the manufacturers recommendations should be strictly adhered to and followed.

A. PROBLEM
Control/feeder stops feeding electrode wire while welding.

PROBABLE CAUSE
1. Primary line fuse blown.
2. Wire control/feeder.
   a. Control relay defective.
   b. Protective fuse blown.
   c. Wire drive roll gears mis-aligned.
   d. Drive roll pressure too great.
   e. Spindle friction too great.
   f. Excess loading of drive motor.
   g. Drive roll gears worn; slipping.
   h. Drive motor burned out.
3. Torch And Casing Assembly.
   a. Casing liner dirty, restricted.
   b. Broken or damaged casing or liner.
   c. Torch trigger switch defective or wire leads broken.
   d. Contact tube orifice restricted; burnback of electrode.
   e. Friction in torch.

B. PROBLEM:
Electrode wire feeds but is not energized. No welding arc.

PROBABLE CAUSE
1. Primary Line Fuse Blown.
2. Power Source.
   a. Contactor plug not tight in socket.
   b. Contactor control leads broken.
   c. Remote-Standard switch defective or in wrong position.
   d. Primary contactor coil defective.
   e. Primary contactor points defective.
   f. Welding cables loose on terminals.
   g. Ground connection loose.
3. Wire Control/Feeder.
   a. Contactor plug not properly seated.
   b. Contact relay defective.

C. PROBLEM:
Porosity in the weld deposit.

PROBABLE CAUSE:
1. Dirty base metal; heavy oxides, mill scale.
2. Gas cylinder and distribution system.
   a. Gas cylinder valve off.
   b. Regulator diaphragm defective.
   c. Flowmeter cracked or broken.
   d. Gas supply hose connections loose.
   e. Gas supply hose leaks.
   f. Insufficient shielding gas flow.
   g. Moisture in shielding gas.
   h. Freezing of CO_2 regulator/flowmeter.
3. Wire control/feeder.
   a. Gas solenoid defective.
   b. Gas hose connections loose.
4. Torch and Casing Assembly.
   a. Gun body and/or accessories aspirating atmosphere or air.
   b. Contact tube extended too far.
   c. Nozzle to work distance too great.
   d. Improper torch angle.
   e. Welding speed too fast.
   f. Electrode not centered in nozzle.
5. Improper Electrode Wire Composition.

D. PROBLEM:
Welding Electrode wire stubs into workpiece.

PROBABLE CAUSE
1. Power Source.
   a. Excessive slope numerical values set.
   b. Arc voltage too low.
2. Wire Control/Feeder.
   a. Excess wire feed speed.

E. PROBLEM:
Excessive spatter while welding.

PROBABLE CAUSE:
1. Shielding Gas System.
   a. Excessive gas flow rates.
   b. Insufficient gas flow.
2. Power Source.
   a. Excessive arc voltage.
   b. Insufficient slope setting value.
3. Torch contact tube recessed in nozzle too far.
4. Improper electrode.

F. PROBLEM:
Weld bead appearance indicates need for more amperage and/or larger bead.

PROBABLE CAUSE:
1. Power Source.
   a. Volt-ampere condition too low.

G. PROBLEM:
Weld bead appearance indicates need for less amperage and/or smaller bead.

PROBABLE CAUSE
1. Power Source.
   a. Volt-ampere condition too high.

GENERAL

The two basic types of metal transfer are spray and short circuit. Spray transfer comprises a steady stream of fine droplets moving across a physical space from the electrode to the workpiece. The short circuit welding technique transfers metal from the electrode to the workpiece on contact only. The electrode physically touches the work and, since it is electrically energized, short circuits the welding circuit. The short circuiting action occurs many times per second.

POWER SOURCE REQUIREMENTS

Power sources required with the spray transfer technique of gas metal-arc welding is the constant potential type. The constant potential power source may or may not have some method of slope control.

The short circuit method of metal transfer requires a constant potential class power source with some method of slope control. Slope settings may be fixed or adjustable by tapping a reactor either mechanically or electrically.

MILD STEEL AND LOW ALLOY STEEL

The settings provided in Table 6-1 are applicable to most weldable steels. Some modifications will be made for any specific application, of course, because the ranges are necessarily broad. They will constitute a basis for setting a welding condition.

TABLE 6-1. *Short Circuit Transfer - Mild And Low Alloy Steels*

Electrode Diameter	Amperage Range dcrp	Load Voltage	Slope Turns	Power Source
0.030"	70-130	15-21	6	250 Amp CP Welding Machine
0.035"	80-190	16-22	6	250 Amp CP Welding Machine
0.045"	100-225	17-22	6	250 Amp CP Welding Machine

APPROXIMATE POWER SOURCE SETTINGS

The settings shown in Table 6-1 are predicated on using CO_2 shielding gas for mild steel and Argon-CO_2 for low alloy steel.

TABLE 6-2. Spray Transfer - Mild And Low Alloy Steels

Electrode Diameter	Amperage Range dcrp	Load Voltage	Slope Turns	Power Source
0.030"	150-265	24-28	0-3	CP Type
0.035"	175-290	24-28	0-3	CP Type
0.045"	200-315	24-30	0-3	CP Type
1/16"	275-500	24-32	1-4	CP Type
3/32"	350-600	24-33	1-4	CP Type

APPROXIMATE POWER SOURCE SETTINGS

The settings in Table 6-2 are predicated on the use of Argon-5 pct. oxygen shielding gas for Mild and Low Alloy Steels.

TABLE 6-3. Short Circuit Transfer - Stainless Steel 300 Series

Electrode Diameter	Amperage Range dcrp	Load Voltage	Slope Turns	Power Source
0.030"	50-145	17-22	8-12	CP Type w/slope
0.035"	65-175	17-22	8-10	CP Type w/slope
0.045"	100-210	17-22	8-10	CP Type w/slope

APPROXIMATE POWER SOURCE SETTINGS

The settings shown in Table 6-3 are predicated on the use of a tri-gas mixture of 90 pct. HE; 7-1/2 pct. A; 2-1/2 pct. CO_2 for Stainless Steel 300 Series. Flow rates were approximately 20 cfh.

TABLE 6-4. Spray Transfer - Stainless Steel 300 Series

Electrode Diameter	Amperage Range	Load Voltage	Slope Turns	Power Source
0.030"	160-210	24-28	2-6	CP Type
0.035"	180-255	24-29	2-6	CP Type
0.045"	200-300	24-30	2-6	CP Type
1/16"	215-325	24-32	0-4	CP Type
3/32"	225-375	24-32	0-4	CP Type

APPROXIMATE POWER SOURCE SETTINGS

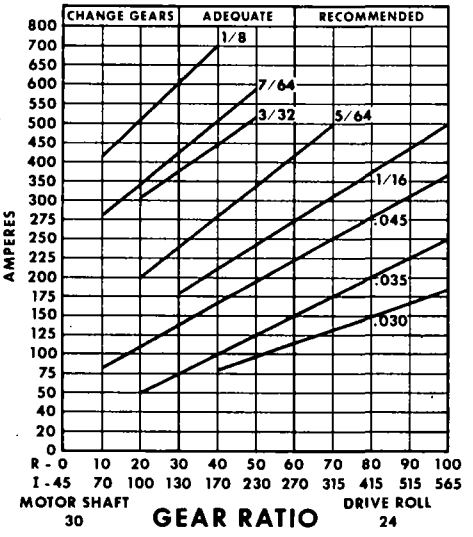
The settings shown in Table 6-4 are predicated on the use of Argon-Oxygen shielding gases for Stainless Steel 300 Series. Oxygen percentage varies from 1-5 pct.

TABLE 6-5. Flux Cored Settings

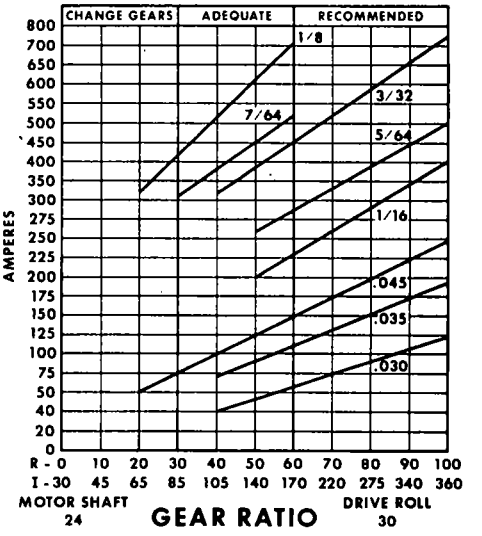
Wire Size	Arc Amps	Arc Volts	Gas Type	Gas Flow
1/16"	290 - 325	28 - 31	CO_2	40 - 48 CFH
5/64"	350 - 400	29 - 32	CO_2	40 - 48 CFH
3/32"	400 - 450	29 - 32	CO_2	40 - 48 CFH
7/64"	425 - 475	29 - 32	CO_2	40 - 48 CFH
1/8"	475 - 550	29 - 32	CO_2	40 - 48 CFH

TABLE 6-6. Amperage Output For Various Speed Change Gear Combinations
Figures Based On Use Of CO_2 Shielding Gas

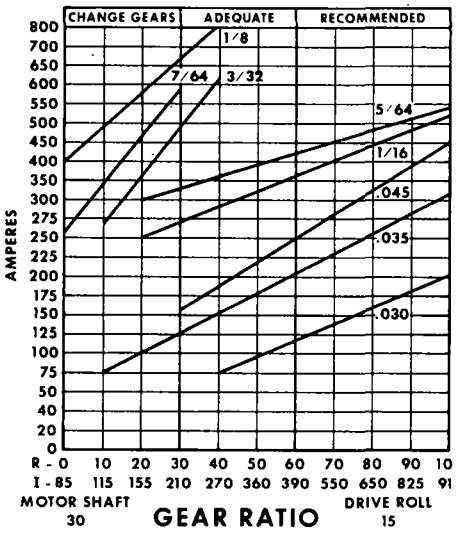
Graph A



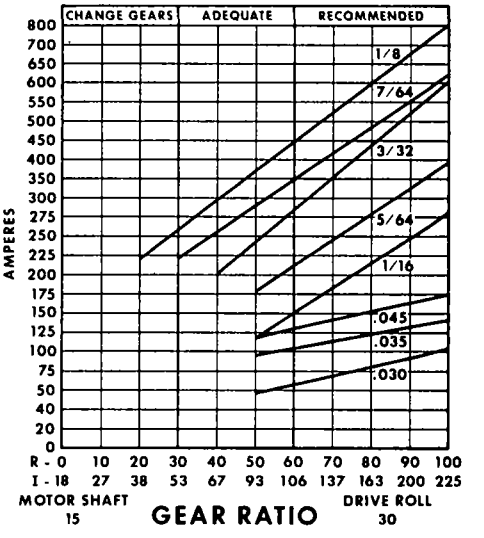
Graph B



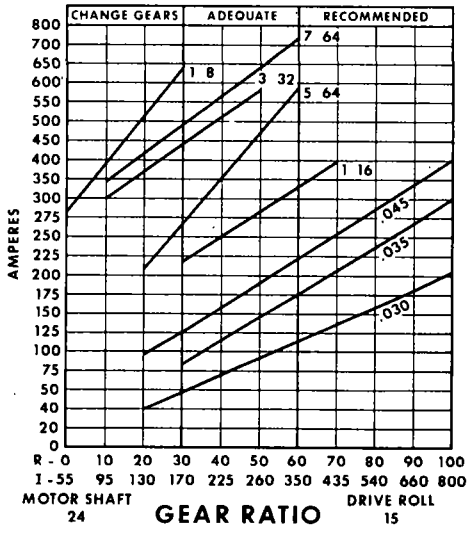
Graph C



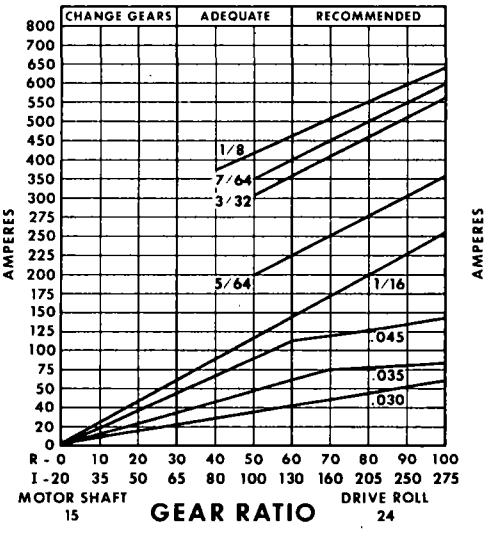
Graph D



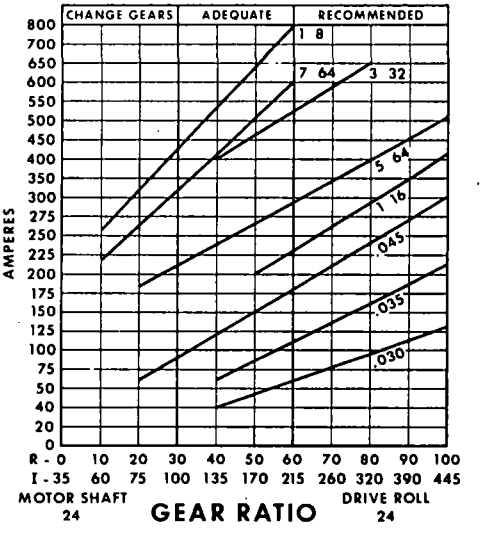
Graph E



Graph F

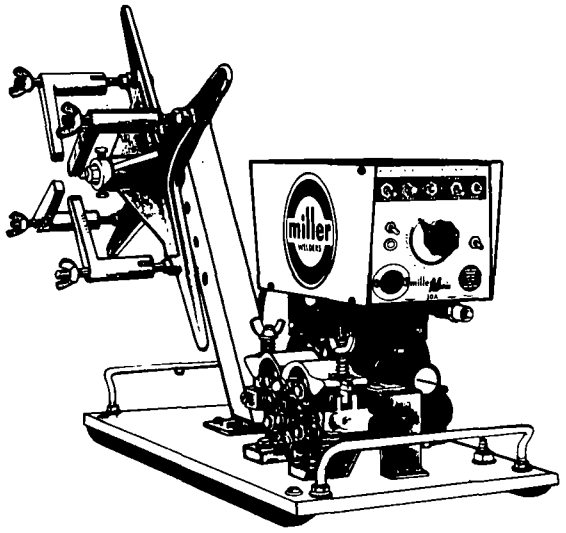


Graph G



R=Wire Speed Control Settings I= Inches Per Minute

August 1973 FORM: OM-1234



MODEL	STOCK NO.
MILLERMATIC 30AN CONTROL/FEEDER	
.030 Wire V-Groove	058 484
.035 Wire V-Groove	058 485
.045 Wire V-Groove	058 486
1/16 Wire V-Groove	058 488
.045 Wire U-Groove	058 489
.052 Wire V-Groove	058 487
1/16 Wire U-Groove	058 490
5/64 Wire U-Groove	058 491
3/32 Wire U-Groove	058 492
7/64 Wire U-Groove	058 493
1/8 Wire U-Groove	058 494
1/16 Wire V-Knurled	058 495
5/64 Wire V-Knurled	058 496
3/32 Wire V-Knurled	058 497
7/64 Wire V-Knurled	058 498
1/8 Wire V-Knurled	058 499

MODEL/STOCK NO.	SERIAL/STYLE NO.	DATE PURCHASED

PARTS LIST

MILLER ELECTRIC MFG. CO.
APPLETON, WISCONSIN, USA 54911

NWSA CODE NO. 4579

PRINTED IN U.S.A.

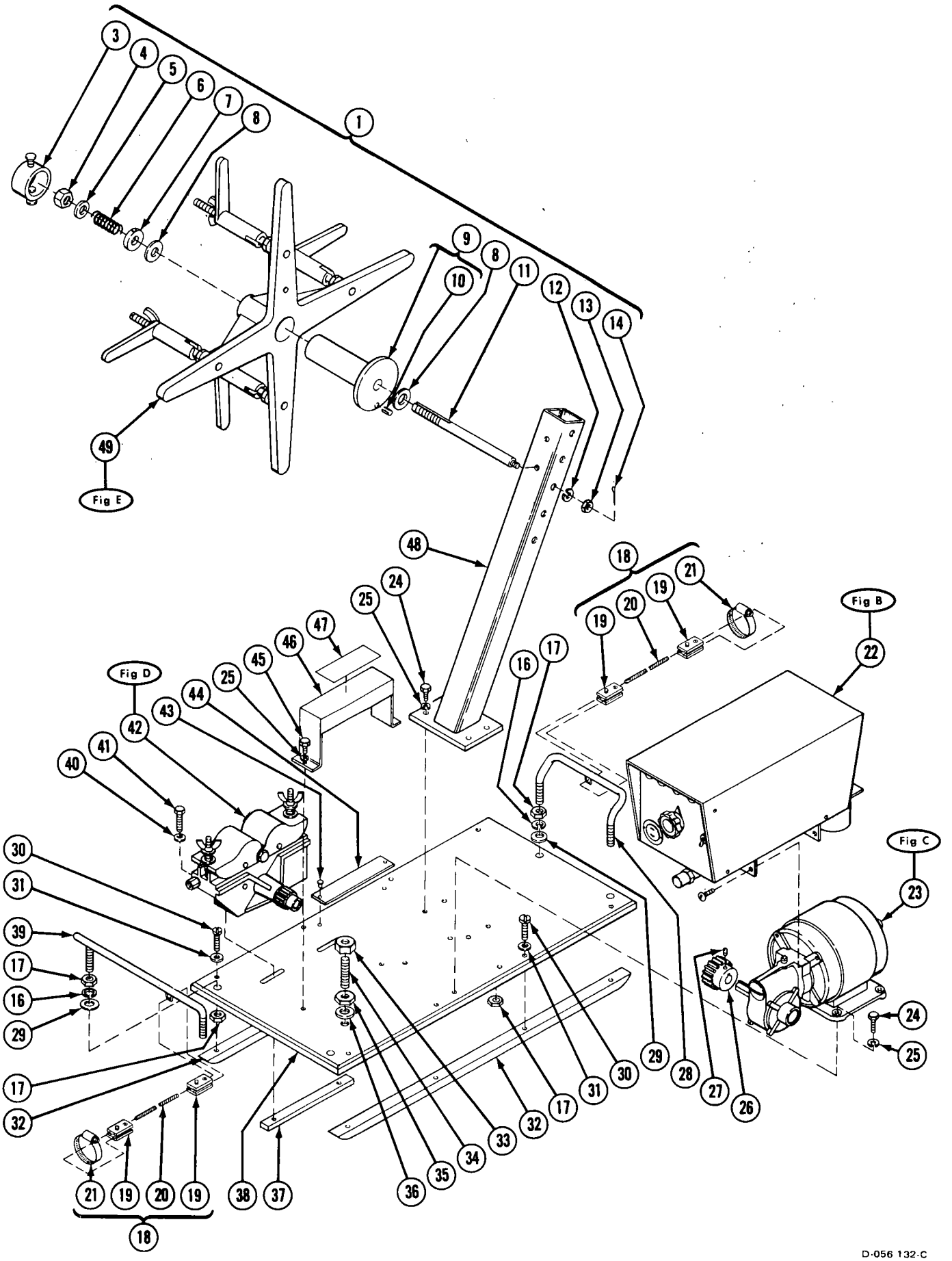


Figure A – Main Assembly

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure A			**Main Assembly**	
1		056 999	HUB & SHAFT ASSEMBLY (consisting of)	1
3		057 666	. RING, retaining	1
4		601 884	. NUT, hex 5/8-11	1
5		602 249	. WASHER, flat 5/8" S.A.E.	1
6		010 233	. SPRING	1
7		057 971	. WASHER, keyed.	1
8		010 191	. WASHER, fiber	2
9		057 622	. HUB ASSEMBLY (consisting of)	1
10		010 225	. . PIN, roll 1/4 x 3/4"	1
11		057 618	. SHAFT, support - spool	1
12		602 213	. WASHER, lock - split 3/8"	1
13		605 181	. NUT, self locking 3/8-16	1
14		605 277	. PIN, cotter 3/32 x 3/4"	1
16		602 213	WASHER, lock split 3/8"	4
17		601 871	NUT, hex - steel 3/8-16 jam	8
18		057 331	STRAIN RELIEF ASSEMBLY (consisting of)	2
19		057 318	. CLAMP, cable	2
20		057 327	. CABLE	1
21		010 860	. CLAMP	1
22		057 334	CONTROL BOX ASSEMBLY (See Fig. B Page 4)	1
23		056 103	MOTOR & GEAR BOX ASSEMBLY (See Fig. C Page 8)	1
24		604 631	SCREW, cap - hex hd 1/4-20 x 1"	8
25		602 207	WASHER, lock - split 1/4"	10
26		056 093	GEAR, fiber 30 tooth	1
		056 092	GEAR, fiber 24 tooth	1
		056 094	GEAR, steel 15 tooth	1
27		604 799	SCREW, set 1/4-20 x 3/4"	1
28		057 319	HANDLE, lifting - rear	1
29		010 910	WASHER, flat 3/8" S.A.E.	4
30		604 475	SCREW, self - tapping 1/4-20 x 1-1/4"	8
31		602 241	WASHER, flat 1/4" S.A.E.	8
32		056 330	SKID, base	2
33		601 839	NUT, hex - brass 1/2-13	1
34		038 825	STUD, brass	1
35		601 840	NUT, hex - brass 1/2-13 jam	1
36		602 247	WASHER, flat 1/2" S.A.E.	1
37		056 327	BAR, anchoring - drive roll	1
38		056 225	BASE	1
39		057 320	HANDLE, lifting - front	1
40		604 538	WASHER, flat 5/16" S.A.E.	2
41		601 959	SCREW, cap - hex hd 5/16-18 x 1-1/2"	2
42		058 546	DRIVE ASSEMBLY, wire (See Fig. D Page 10)	1
43		602 024	SCREW, drive No. 2	2
44			NAMEPLATE (order by stock, model and serial numbers)	1
45		601 926	SCREW, cap - hex hd 1/4-20 x 5/8"	2
46		056 331	GUARD, gear - drive roll	1
47		012 236	LABEL	1
48		056 322	SUPPORT, reel	1
49		056 416	REEL ASSEMBLY (See Fig. E Page 11)	1
		056 442	CONNECTOR, body - twistlock 3 wire	1
		039 618	CAP, twistlock 2 wire	1
		010 603	FITTING, coupling - barbed	1
		010 606	NUT, brass 5/8-18 R. H. thread	1

BE SURE TO PROVIDE STOCK, MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

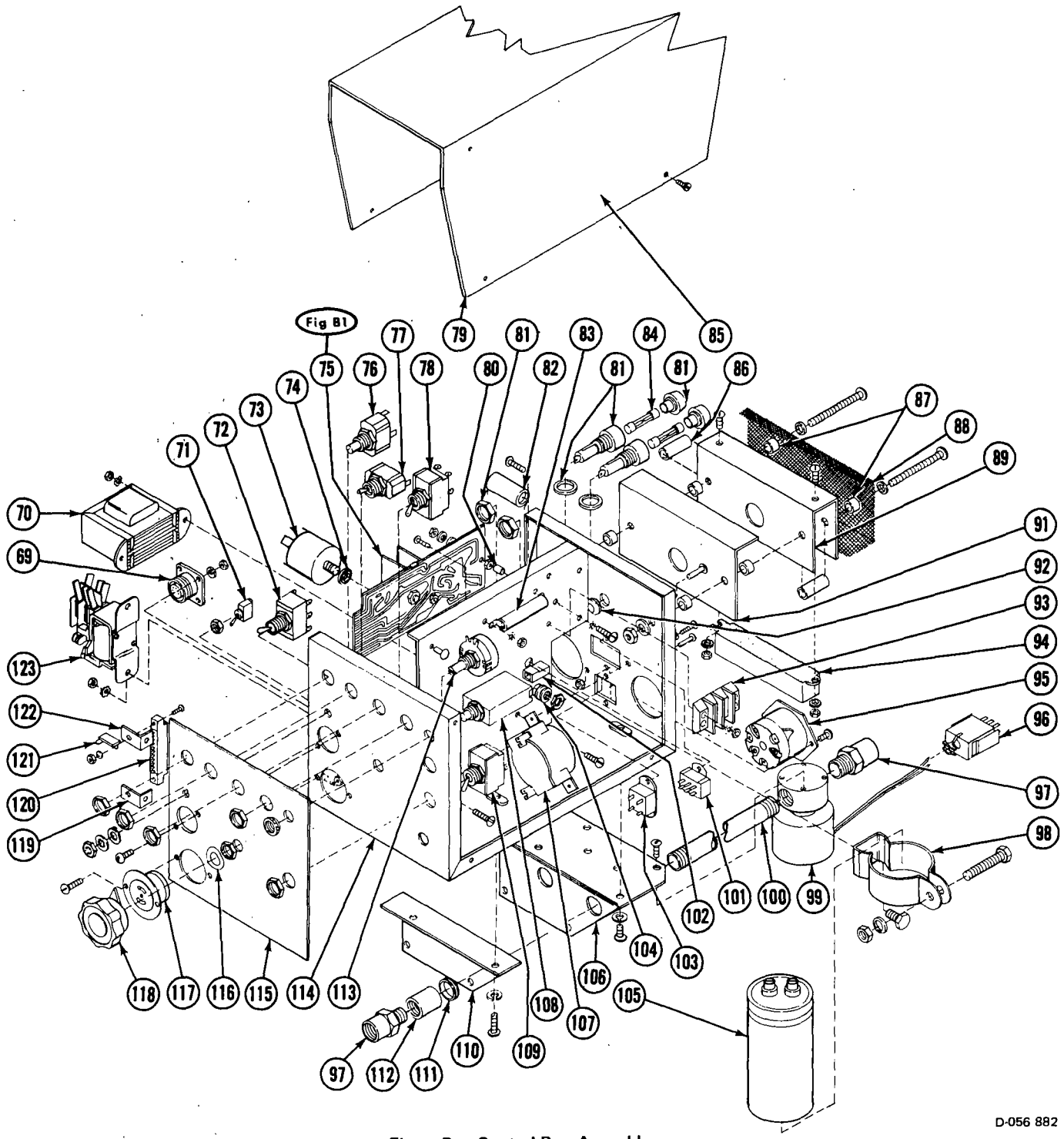


Figure B – Control Box Assembly

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure B		**057 334**	**Control Box Assembly (See Fig. A Page 2 Item 22)**	
69	RC6	039 825	CONNECTOR, receptacle - femal 6 pin	1
70	T1	*036 135	TRANSFORMER	1
71	S6	*011 770	SWITCH, toggle - minature SPDT	1
72	S4	011 990	SWITCH, toggle - DPDT inch	1
73	SR1	*037 167	BRIDGE ASSEMBLY	1
74		604 415	WASHER, insulating	1
75		057 314	BOARD ASSEMBLY, printed circuit (See Fig. B1 Page 5)	1
76	S5	011 232	SWITCH, momentary push SPDT	1
77	S3	011 233	SWITCH, toggle SPDT start	1
78	S2	011 059	SWITCH, toggle DPDT feeder - retract	1
79		056 328	WRAPPER	1
80		010 301	BUSHING, steel	1
81		012 617	HOLDER, fuse	2
82	TR1	*037 551	THYREACTOR, 150 volt	1
83	R1	*030 942	RESISTOR, 10 ohm 12 watt	1
84	F1,2	*012 655	FUSE, 10 ampere	2
85			DECAL	2
86		010 199	SPACER, 1/4 x 3/8 x 15/16"	2
87		010 193	SPACER, 1/4 x 3/8 x 1/4"	6
88		056 170	SHIELD, resistor	1
89		030 949	HEAT SINK	1
91		056 169	BRACKET, mtg - heat sink	1
92		057 084	BUSHING, snap - in	1
93	1T	038 855	BLOCK, terminal 2 post	1
94	R2	*030 941	RESISTOR, 5 ohm	1
95	RC7	056 665	RECEPTACLE, motor base - 3 wire twistlock	1
96		056 265	PLUG, 6 prong	1
97		010 604	ADAPTER, right hand	2
98		010 926	HANGER, No. 2 Minerallic	1
99	GS1	035 601	SOLENOID, valve (consisting of)	1
		*033 050	. COIL, 115 volt	1
100		010 190	NIPPLE, 1/4 x 9-3/4"	1
101	RC4	056 266	RECEPTACLE, 6 wire	1
102		026 837	INSULATOR, nylon - terminal	2
103	RC1	054 116	RECEPTACLE, 4 wire	1
104		602 193	WASHER, fiber 1/4 ID x 1/2 OD x 1/16"	1
105	C1	*031 692	CAPACITOR, 750 mfd 200 volt	1
106		056 165	BRACKET, mtg - rear	1
107	RC3	039 855	RECEPTACLE, twistlock 2 wire	1
108	CB1	*011 991	BREAKER, circuit - 1.5 ampere	1
109	S1	*011 020	SWITCH, toggle - DPST	1
110		056 166	BRACKET, mtg - front	1
111		010 378	GROMMET, rubber 9/16 ID 3/4" hole	1
112		602 934	COUPLING, 1/4" pipe	1
113		*030 943	POTENTIOMETER, 15K ohm 2 watt	1
114		056 720	CASE, base with chassis	1
115			NAMEPLATE (order by model and style number)	1
116		010 929	WASHER, anti rattle 3/8"	1
117	RC2	039 759	RECEPTACLE, twistlock - flush 2 wire	1
118		019 609	KNOB, potentiometer	1
119		056 214	BRACKET, mtg - printed circuit board	1
120	RC5	039 756	SOCKET, 10 pin	1
121		038 784	STRIP, terminal	1
122		056 171	BRACKET, mtg - printed circuit board	1
123	CR1	*034 841	RELAY, 24 volt ac	1

*Recommended Spare Parts

BE SURE TO PROVIDE STOCK, MODEL AND STYLE NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure B1		**057 314**	**Board Assembly, Printed Circuit (See Fig. B Page 4 Item 75)**	
131	C10	031 633	CAPACITOR, 80 mfd 25 volt	1
132	R9	030 936	RESISTOR, 33K ohm 1/2 watt	1
133	R8	030 944	POTENTIOMETER, 5K ohm 2 watt	1
134	C4,8,9	031 643	CAPACITOR, .01 mfd 500 volts dc	3
135	R3	030 937	RESISTOR, 10 ohm 1/2 watt	1
136	D1-4	037 061	DIODE, IN4820	4
137	Q1	037 824	SCR, No. C-20B	1
		010 915	WASHER, flat - brass 1/4"	1
		602 208	WASHER, lock - external tooth 1/4"	1
		601 867	NUT, hex - jam 1/4-28	1
138	R4	030 854	RESISTOR, 18K ohm 1/2 watt	1
139	R10	030 853	RESISTOR, 2.2K ohm 1/2 watt	1
141	R12	030 934	RESISTOR, 6.8K ohm 1/2 watt	1
142	R7	030 940	RESISTOR, 2K ohm 1/2 watt	1
143	C2,3	031 694	CAPACITOR, .047 mfd 200 volt	2
144		057 332	BOARD, printed circuit	1
145	R20	030 090	RESISTOR, 47 ohm 1/2 watt	1
146		037 261	HEAT SINK	1
147	R6	030 945	RESISTOR, 4.7K ohm 2 watt	1
148	T2	036 143	TRANSFORMER, pulse	1
149	C12	031 721	CAPACITOR, .2 mfd 200 volt	1
150	Q2	037 289	TRANSISTOR, unijuction	1
151	C7	031 693	CAPACITOR, .33 mfd 75 volt	1
152	R11	030 938	RESISTOR, 1.2K ohm 1/2 watt	1
153	D5	037 250	DIODE, zener 1 watt 24 volt	1

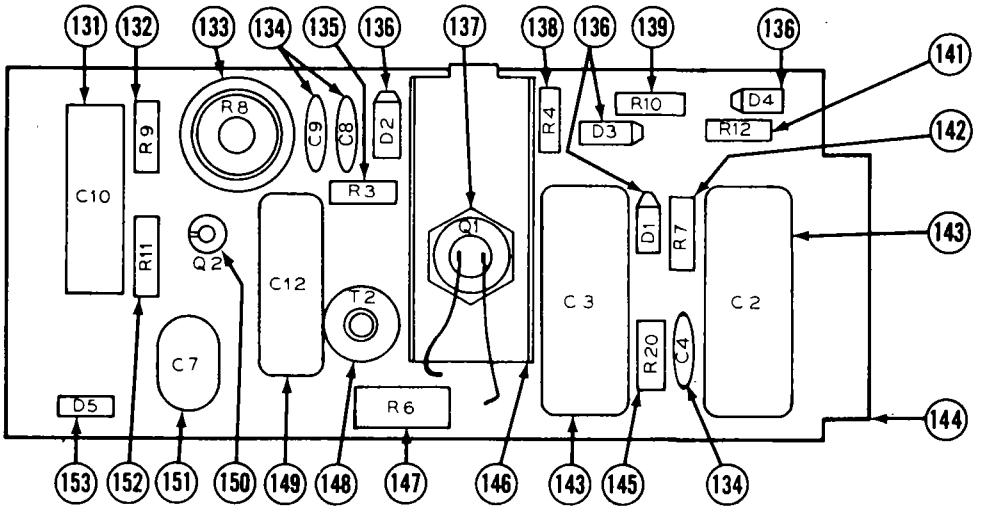


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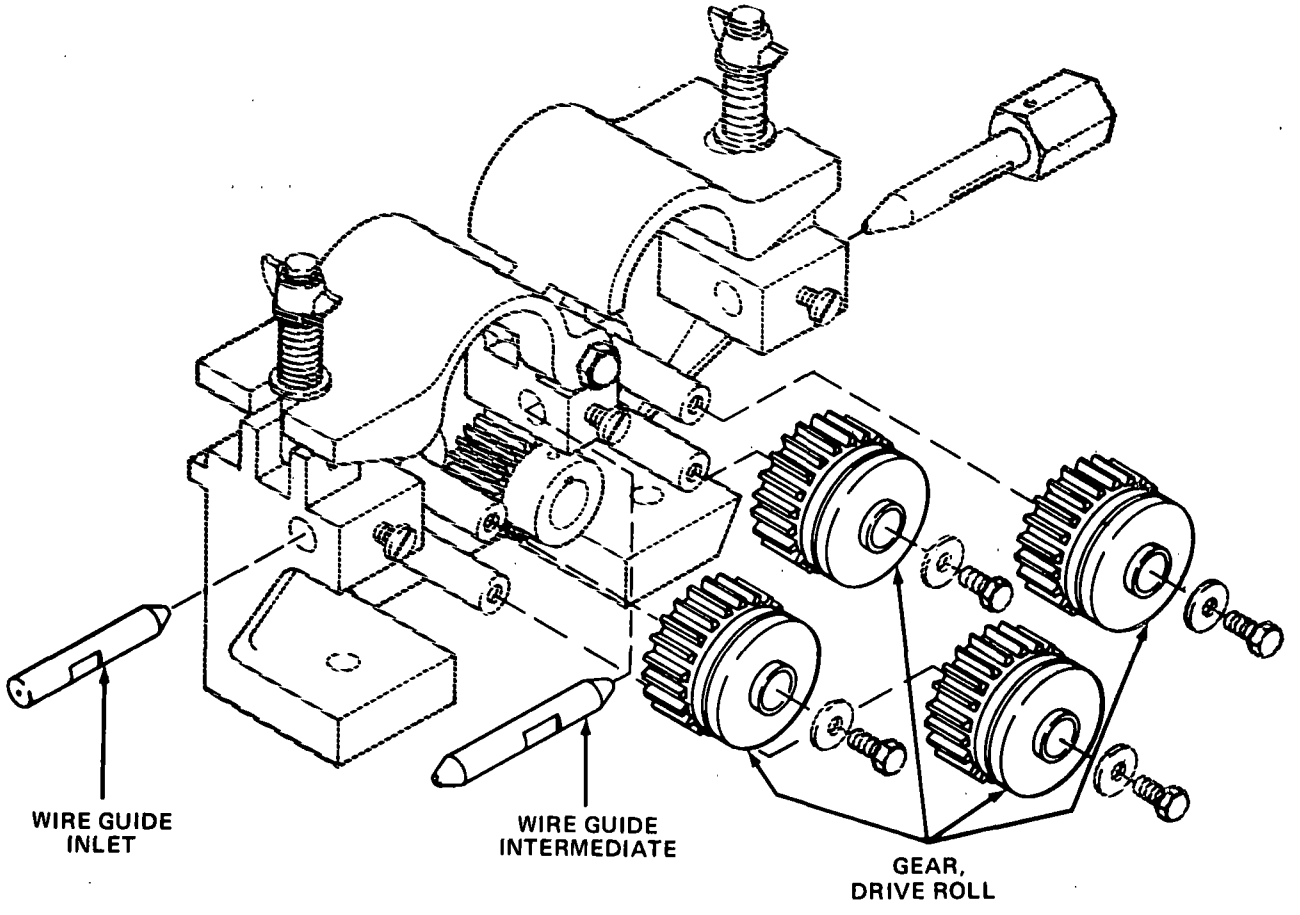
Figure B1 – Board Assembly, Printed Circuit

BE SURE TO PROVIDE STOCK, MODEL AND STYLE NUMBERS WHEN ORDERING REPLACEMENT PARTS.

WIRE DRIVE ROLL GEARS AND WIRE GUIDES FOR VARIOUS WIRE SIZES

Control/ Feeder	Wire Diameter and Type			Kit No.	Gear Drive Roll		Guide Part Numbers	
	Fraction	Decimal	Metric		Part No.	Type	Inlet	Intermediate
058 484	.030" hard	.030	.8MM	058 500	058 516	V-Groove	056 192	056 206
058 485	.035" hard	.035	.9MM	068 501	058 517	V-Groove	056 192	056 206
058 486	.045" hard	.045	1.2MM	068 502	058 518	V-Groove	056 193	056 207
058 487	.052" hard	.052	1.3MM	058 503	058 482	V-Groove	056 193	056 207
058 488	1/16" hard	.062	1.6MM	058 504	058 519	V-Groove	056 195	056 209
058 489	.045" hard & cored	.045	1.2MM	058 505	058 520	U-Groove	056 193	056 207
058 490	1/16" hard & cored	.062	1.6MM	058 506	058 521	U-Groove	056 195	056 209
058 491	5/64" hard & cored	.078	2.0MM	058 507	058 522	U-Groove	056 195	056 209
058 492	3/32" hard & cored	.093	2.4MM	058 508	058 523	U-Groove	056 196	056 210
058 493	7/64" hard & cored	.109	2.8MM	058 509	058 524	U-Groove	056 196	056 210
058 494	1/8" hard & cored	.125	3.2MM	058 510	058 525	U-Groove	056 197	056 211
058 495	1/16" cored	.062	1.6MM	058 511	058 526	V-Knurled	056 195	056 209
058 496	5/64" cored	.078	2.0MM	058 512	058 527	V-Knurled	056 195	056 209
058 497	3/32" cored	.093	2.4MM	058 513	058 528	V-Knurled	056 196	056 210
058 498	7/64" cored	.109	2.8MM	058 514	058 529	V-Knurled	056 196	056 210
058 499	1/8" cored	.125	3.2MM	058 515	058 530	V-Knurled	056 197	056 211

Outlet guide is furnished with torch assembly.



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Wire Drive Roll Gear And Guide Assembly

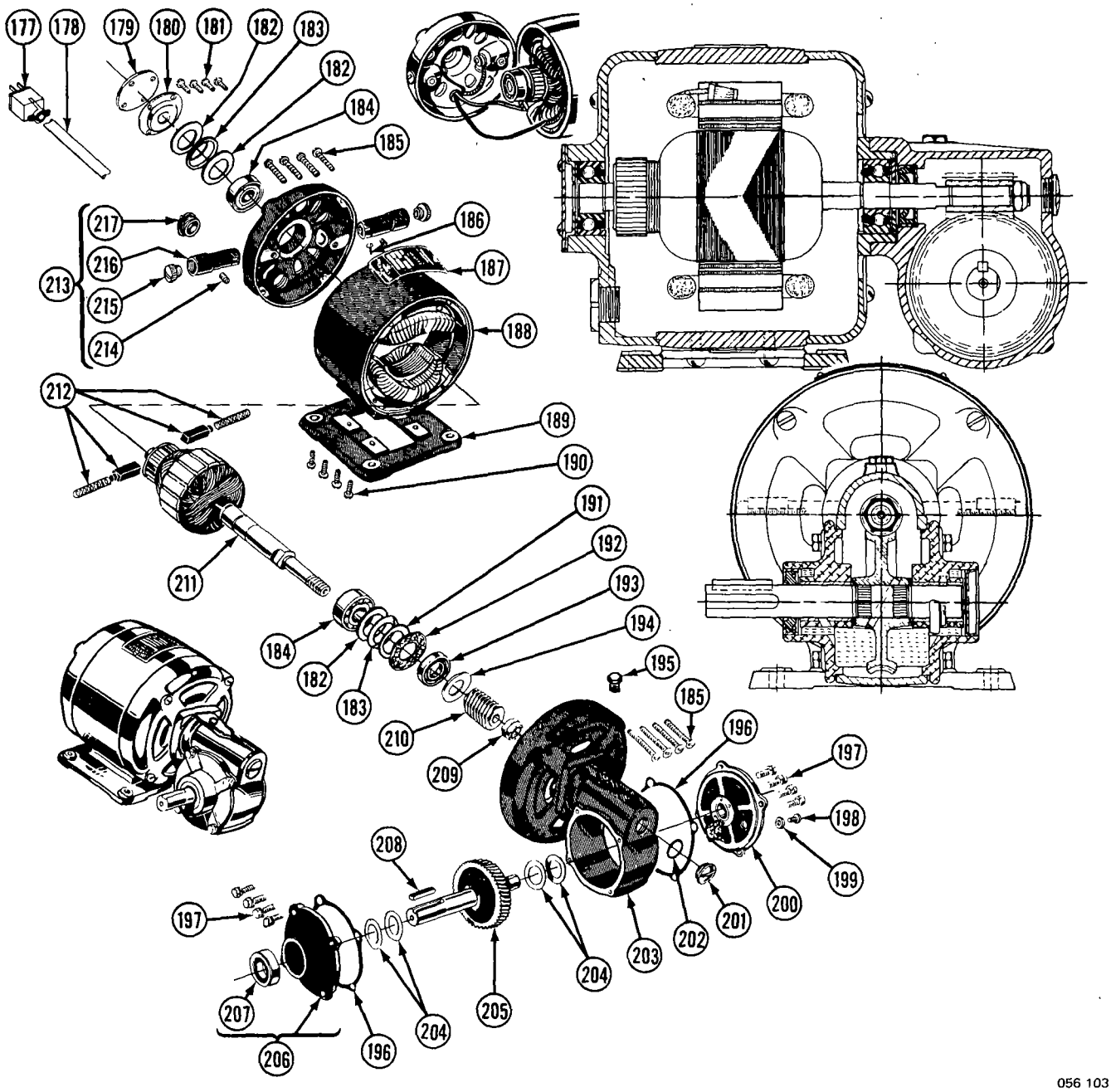
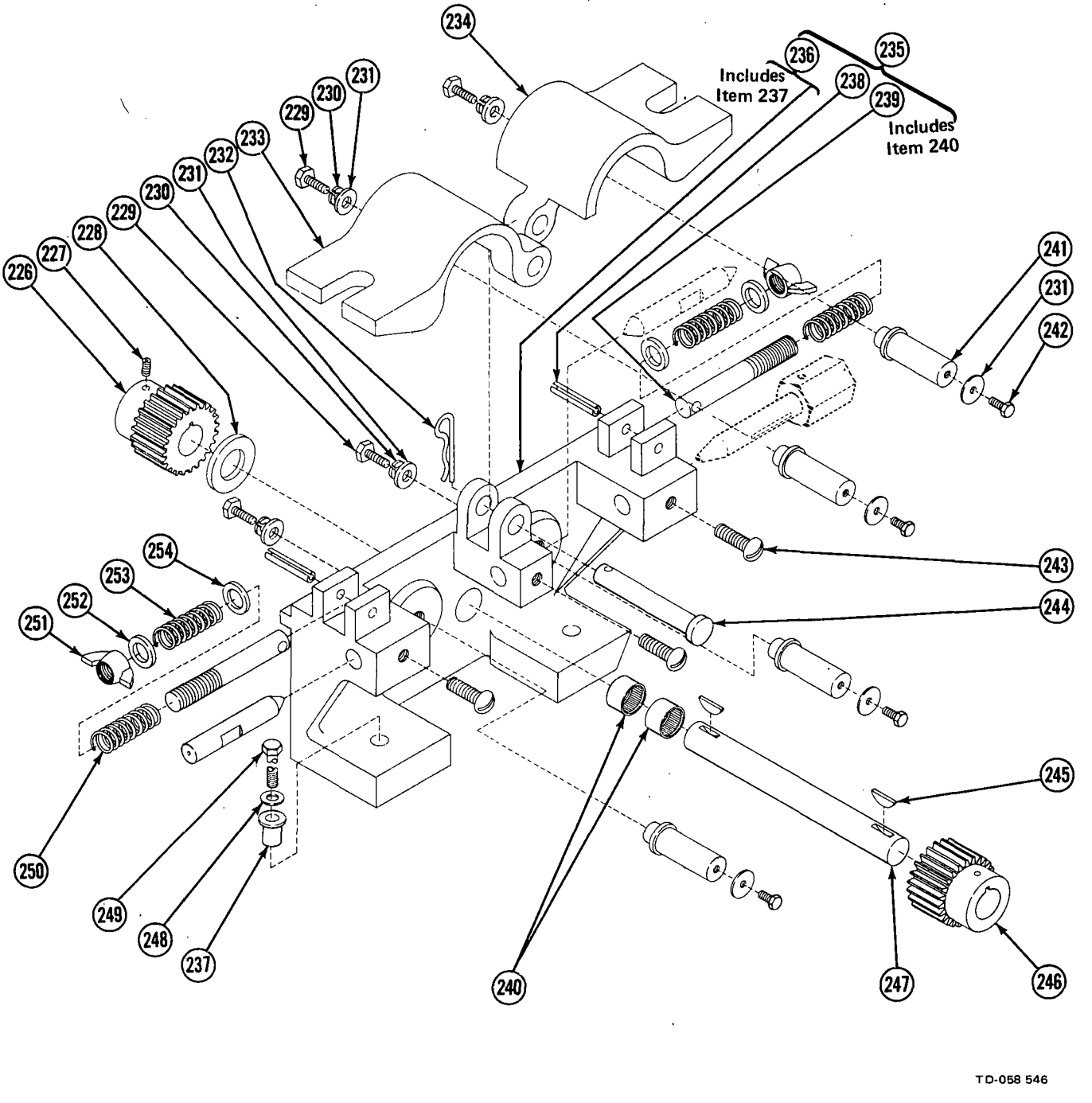


Figure C – Motor, Gear

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure C		**056 103**	**Motor, Gear (See Fig. A Page 2 Item 23)**	
177		056 264	PLUG, 4 prong	1
178		604 571	CORD, portable No. 18/4 conductor (order by foot)	2 ft.
179		054 393	PLATE, ball bearing (closed)	1
180		054 394	WASHER, felt retainer	1
181		054 395	SCREW, ball bearing plate	4
182		054 396	WASHER, spacer	As Reg'd
183		054 434	WASHER, spring	2
184		054 397	BEARING, ball	2
185		054 403	SCREW, shield	8
186		056 373	PIN, nameplate	2
187		054 404	NAMEPLATE	1
188		054 406	RING & FIELD ASSEMBLY	1
189		054 407	BASE	1
190		054 408	SCREW, base	4
191		054 413	WASHER, spacing	As Reg'd
192		054 414	GASKET, grease	1
193		054 415	SEAL, oil	1
194		054 416	WASHER, steel	1
195		054 433	PLUG, oil fill and air vent	1
196		054 424	GASKET, gear housing end shield	2
197		054 423	SCREW, gear housing end shield	8
198		054 432	SCREW, oil level	1
199		054 431	GASKET, oil screw	1
200		054 430	END SHIELD ASSEMBLY, gear housing	1
201		056 374	PLUG, gear housing	1
202		056 375	GASKET, gear housing plug	1
203		056 376	GEAR & REAR SHIELD HOUSING ASSEMBLY	1
204		054 425	WASHER, spacing	As Reg'd
205		056 377	GEAR & DRIVE SHAFT	1
206		054 420	END SHIELD ASSEMBLY, gear housing	1
207		054 422	. SEAL	1
208		054 426	KEY	1
209		054 418	NUT, lock worm	1
210		054 417	GEAR, worm	1
211		054 411	ARMATURE	1
212		*056 378	BRUSH & SPRING ASSEMBLY	2
213		054 399	FRONT SHIELD ASSEMBLY (enclosed)	1
214		054 401	. SCREW, set - brushholder	2
215		054 398	. SCREW, brushholder cap	2
216		054 400	. HOLDER, brush	2
217		054 402	. BUSHING, terminal	1

*Recommended Spare Parts

BE SURE TO PROVIDE STOCK, MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.



TD-058 546

Figure D – Drive Assembly, Wire

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure D		**058 546**	**Drive Assembly, Wire (See Fig. A Page 2 Item 42)**	
226		058 478	GEAR, spur - steel 24 tooth	1
227		602 179	SCREW, set 1/4-20 x 1/2	2
228		010 658	BEARING, thrust 5/8 ID x 1/4 OD x 1/8	1
229		601 927	SCREW, cap - steel hex head 1/4-20 x 3/4	4
230		602 207	WASHER, lock - steel split 1/4	4
231		602 241	WASHER, flat - steel SAE 1/4	8
232		010 313	PIN, cotter - hair	1
233		056 152	COVER, rear	1
234		056 151	COVER, front	1
235		058 483	HOUSING, drive (consisting of)	1
236		058 168	. HOUSING, drive with bushing (consisting of)	1
237		058 112	. . BUSHING, flanged - nylon 5/16 ID x 7/16 OD x 3/4	2
238		010 224	. PIN, spring 3/16 x 1	2
239		056 306	. FASTENER, pinned	2
240		605 996	. BEARING, needle	2
241		058 481	SHAFT, drive roll	4
242		601 925	SCREW, cap - steel hex head 1/4-20 x 1/2	4
243		604 624	SCREW, machine - steel fillister head 1/4-20 x 1/2	3
244		010 312	PIN, machine - steel 3/8 x 2-1/4	1
245		605 997	KEY, Woodruff 3/16 x 3/4	2
246		056 091	GEAR, spur - fiber 15 tooth	1
247		058 480	SHAFT, drive gear	1
248		604 538	WASHER, flat - steel SAE 5/16	2
249		601 959	SCREW, cap - steel hex head 5/16-18 x 1-1/2	2
250		010 232	SPRING, compression - bottom	2
251		604 590	NUT, steel - wing 3/8-16	2
252		010 910	WASHER, flat - steel SAE 3/8	2
253		010 231	SPRING, compression - top	2
254		602 243	WASHER, flat - steel standard 3/8	2

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure E		**056 416**	**Reel Assembly (See Fig. A Page 2 Item 49)**	
261		010 910	WASHER, flat 3/8" S.A.E.	2
262		601 964	SCREW, cap - hex head 3/8-16 x 3/4"	1
263		604 051	NUT, wing 1/2-13	4
264		056 312	FINGER	4
265		056 313	STUD, 1/2 x 7"	4
266		010 224	PIN, roll 3/16 x 1"	4
267		601 880	NUT, hex - steel	4
268		056 314	REEL	1

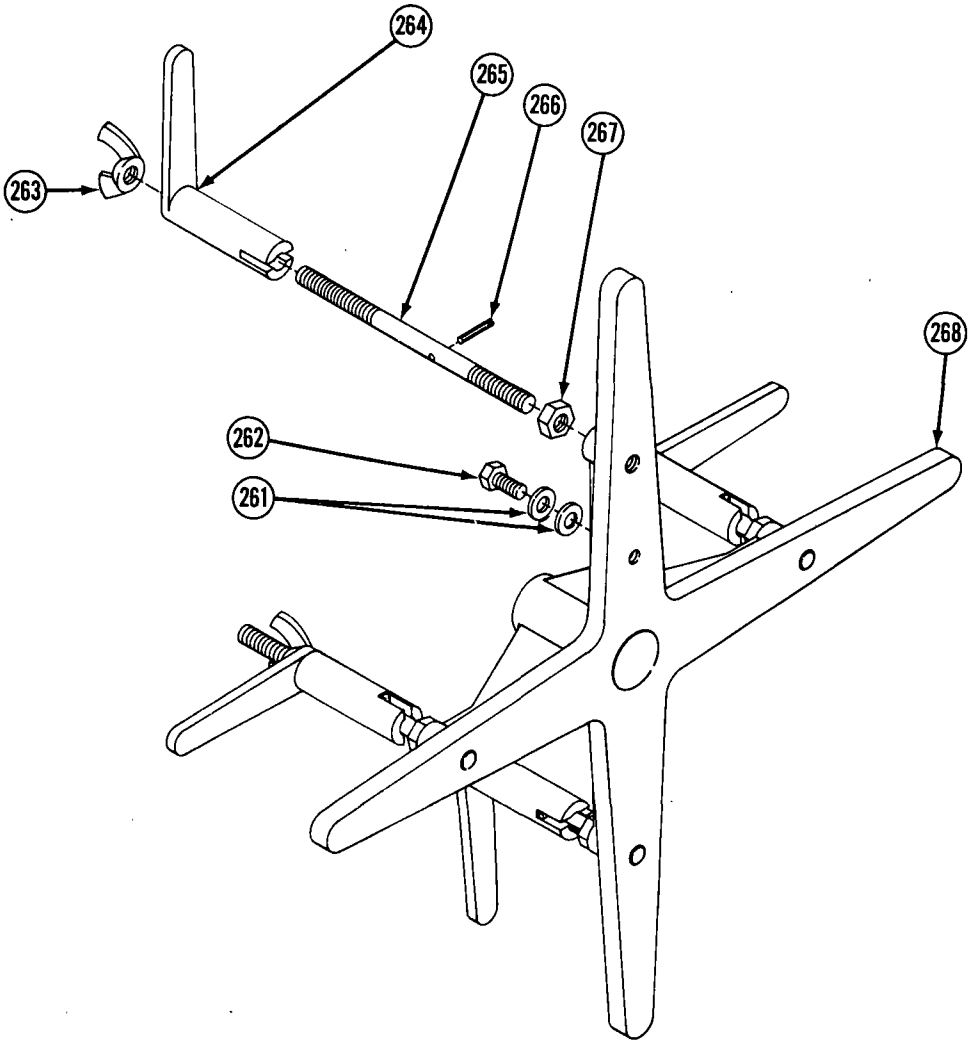


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Figure E – Reel Assembly

BE SURE TO PROVIDE STOCK, MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

ERRATA SHEET

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

SPINDLE ASSEMBLY INSTALLATION ON UNITS EFFECTIVE WITH SERIAL NO. HE741584

1. Insert spindle support shaft (item 12, Figure 2) into the desired hole in spindle support (13). The hole to be utilized in the spindle support (13) will depend on the size of the wire spool being used.

2. Slide washer (14) onto spindle support shaft (12) and secure with nut (15) and cotter pin (16).

3. Slide the following items onto the spindle support shaft (12) in order given:

   A. Flat washer (11)

   B. Flat washer (10)

   C. Spindle (9)

   D. Flat washer (8)

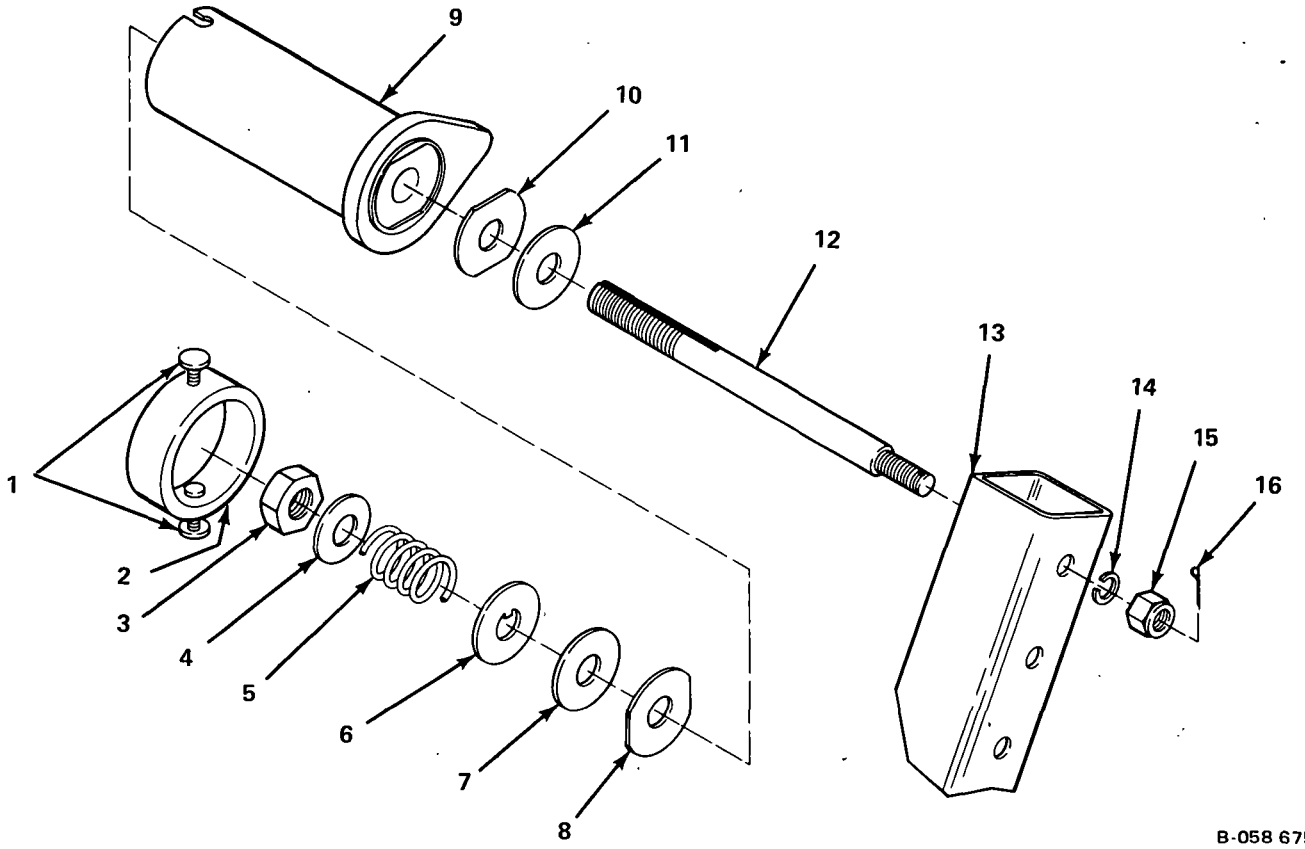
   E. Fiber washer (7)

   F. Keyed washer (6)

   G. Spring (5)

   H. Flat Washer (4)

4. Rotate hex - nut (3) onto support shaft (12). Hex - nut (3) should be rotated only until a slight drag is felt while turning spindle (12).

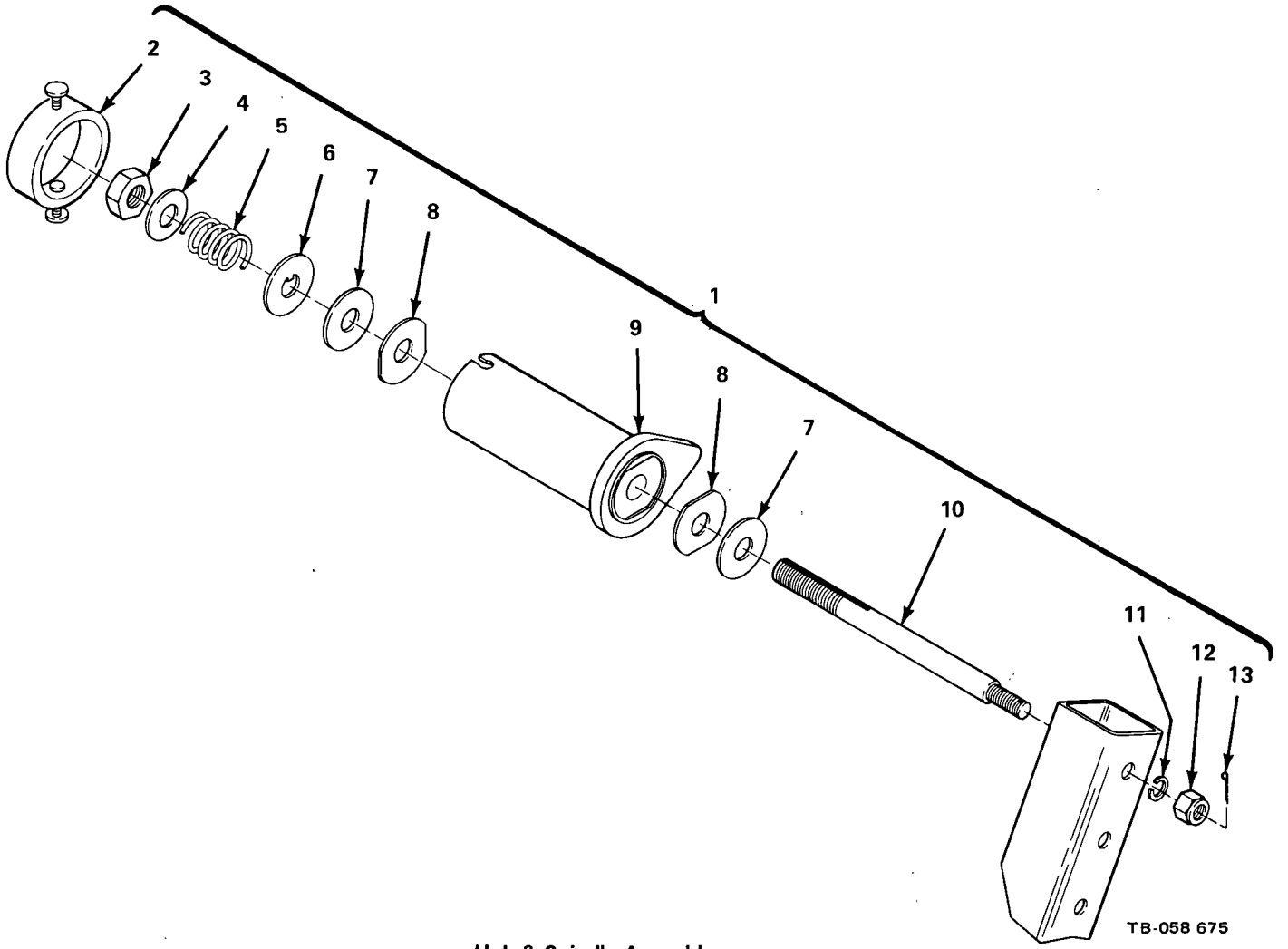


B-058 675

Effective with serial No. HE741584 an alternate Hub & Spindle Assembly has been used. If the Control/Feeder is equipped with an aluminum hub refer to the parts breakdown in the parts list. If the Control/Feeder is equipped with a plastic hub use the parts breakdown on this errata sheet.

Item No.	Factory Part No.	Description	Quantity
1	058 675	HUB & SPINDLE ASSEMBLY (consisting of)	1
2	058 427	. RING, retaining - spool	1
3	601 884	. NUT, steel - hex jam 5/8-11	1
4	605 941	. WASHER, flat - steel 41/64 ID x 1OD	1
5	010 233	. SPRING, compression	1
6	057 971	. WASHER, flat - steel keyed 1-1/2 dia	1
7	010 191	. WASHER, fiber 5/8 ID x 1-1/2OD x 1/8	2
8	058 628	. WASHER, steel - brake	2
9	058 428	. HUB, spool - plastic	1
10	057 618	. SHAFT, support - spool	1
11	602 213	. WASHER, lock - steel split 3/8	1
12	605 181	. NUT, steel - self locking hex 3/8-16	1
13	605 277	. PIN, cotter 3/32 x 3/4	1

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.



Hub & Spindle Assembly